OIL FUEL DEVELOPMENTS. *See p.* 316.
THE BULKHEADS COMMITTEE'S REPORT. *See pp.* 316 & 319.

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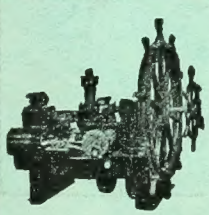

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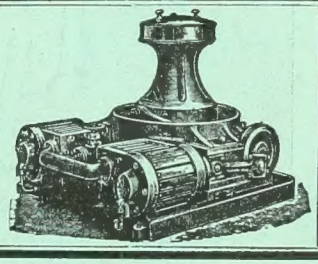

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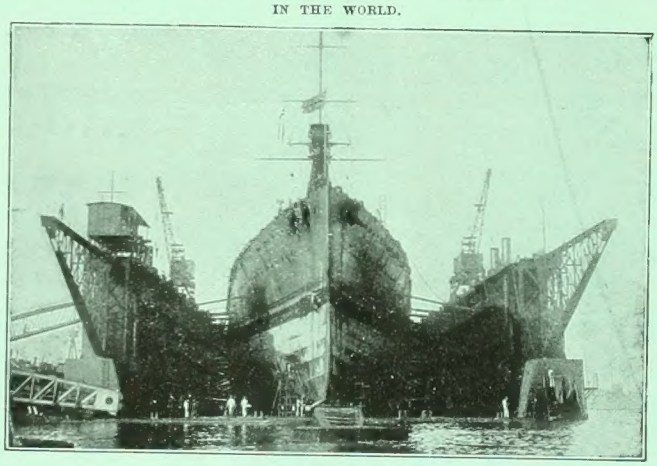

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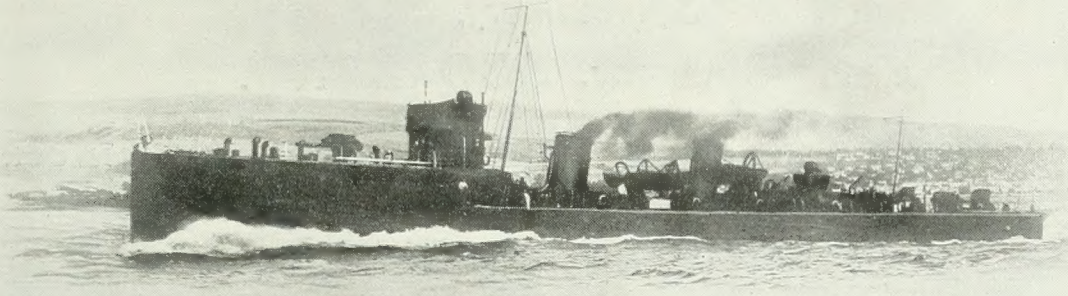

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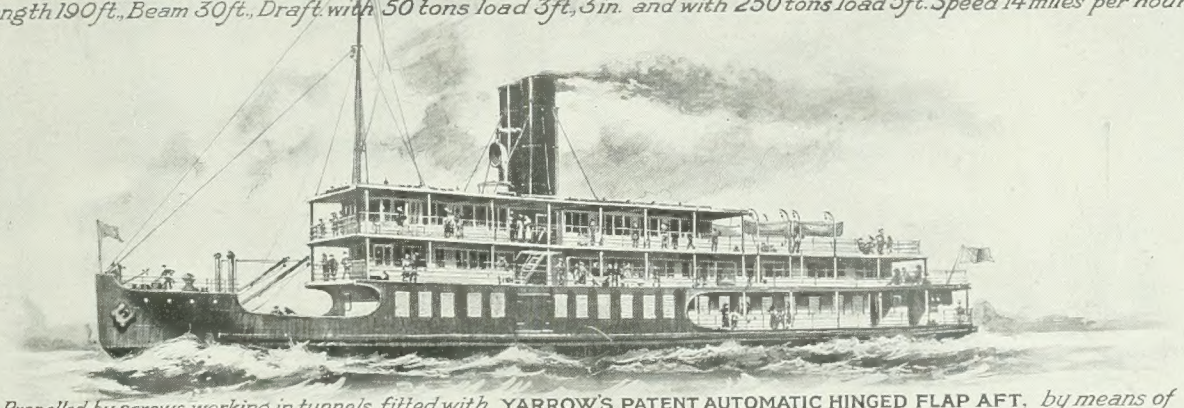

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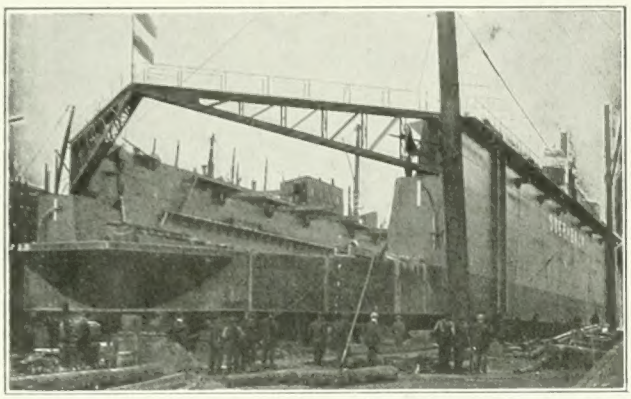
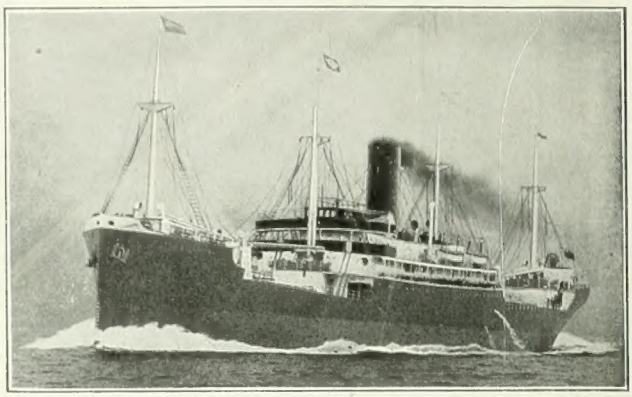


Floating Dock for Soerabaya, Java.



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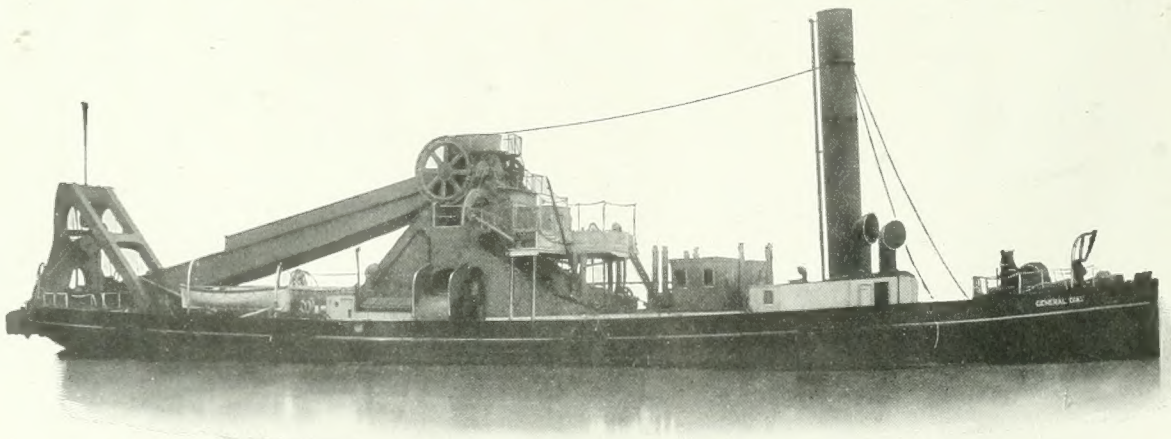

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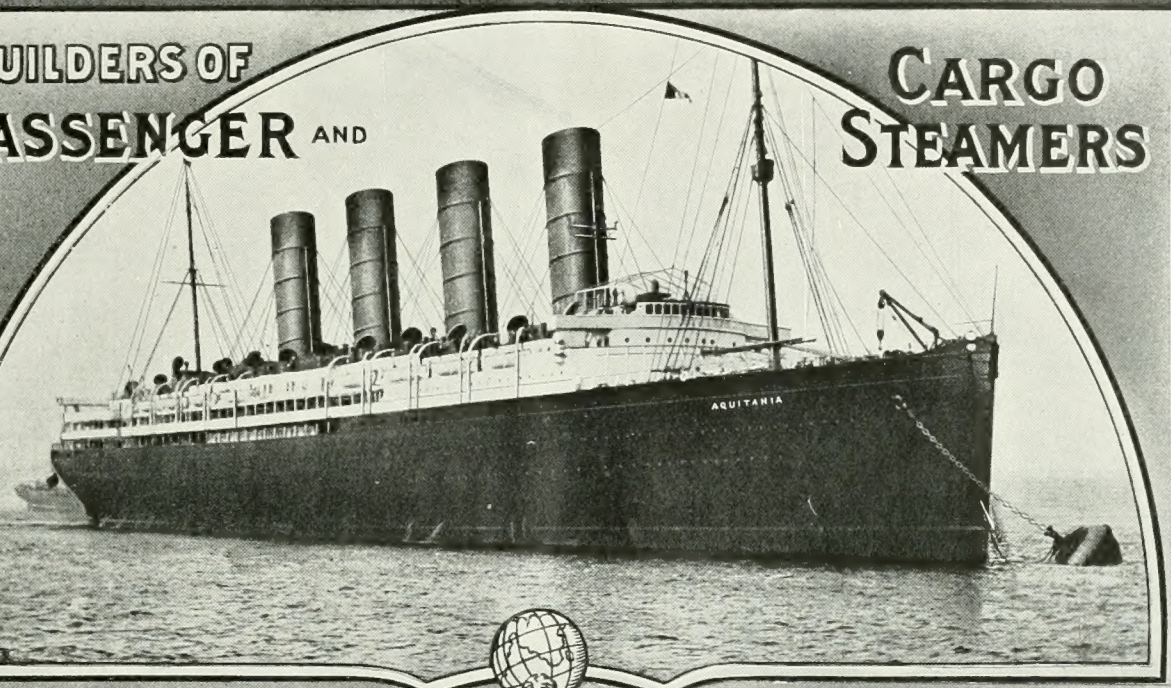

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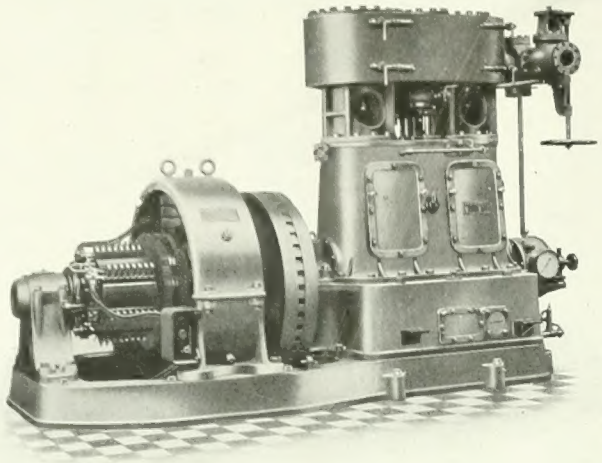

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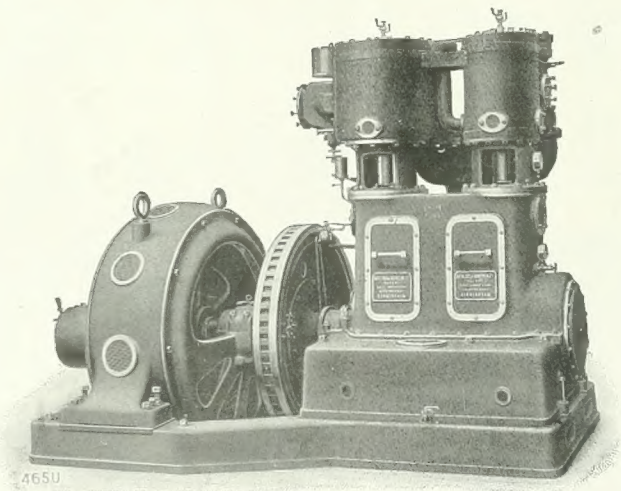

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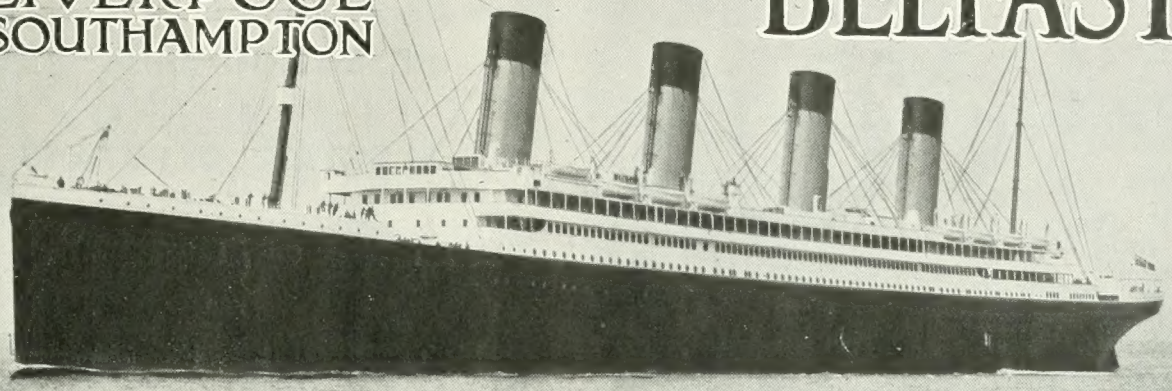

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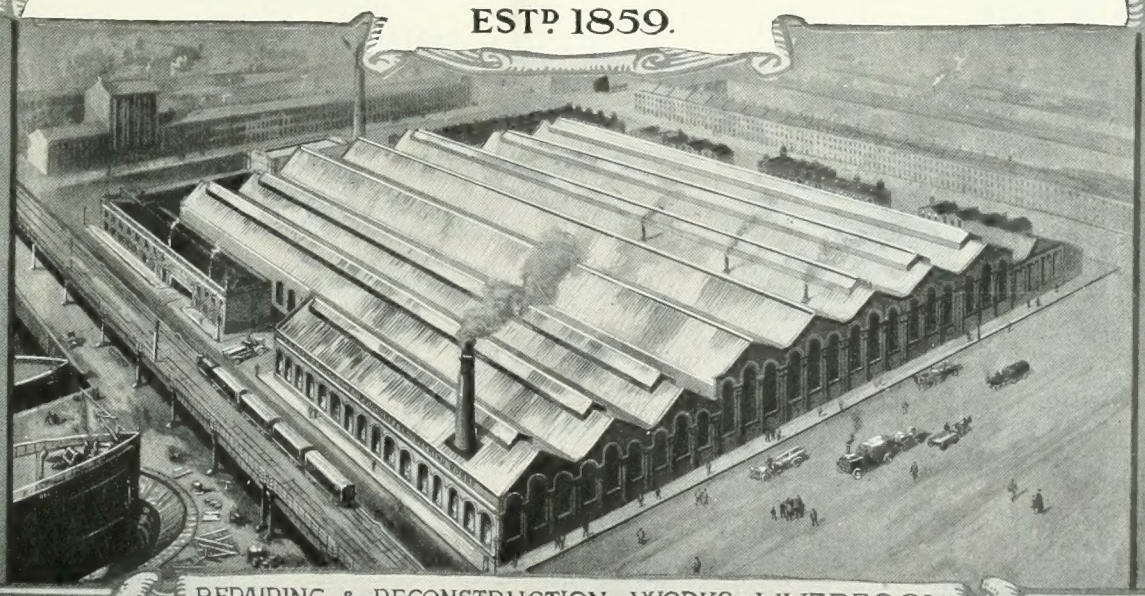

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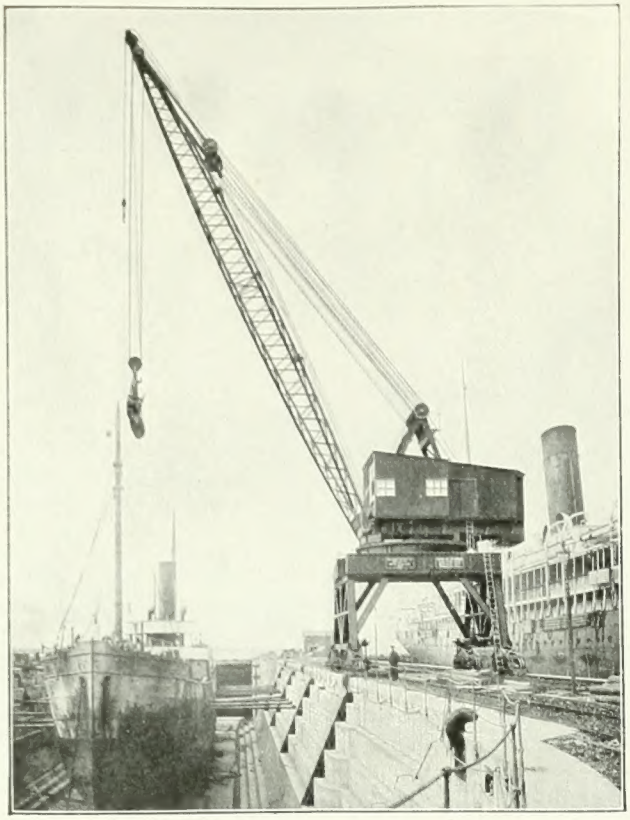

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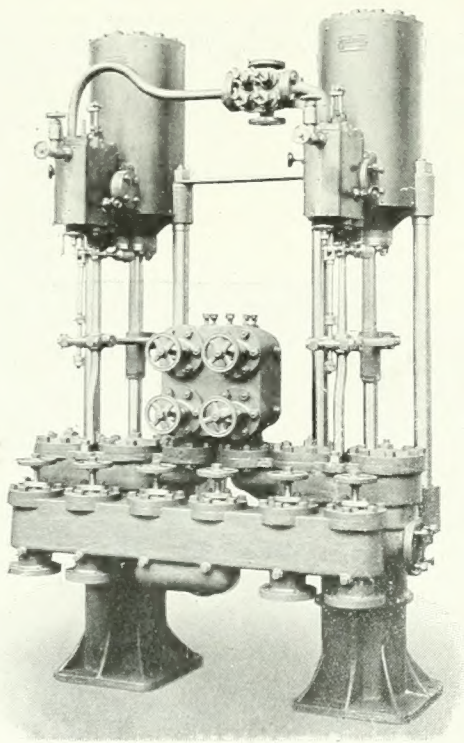

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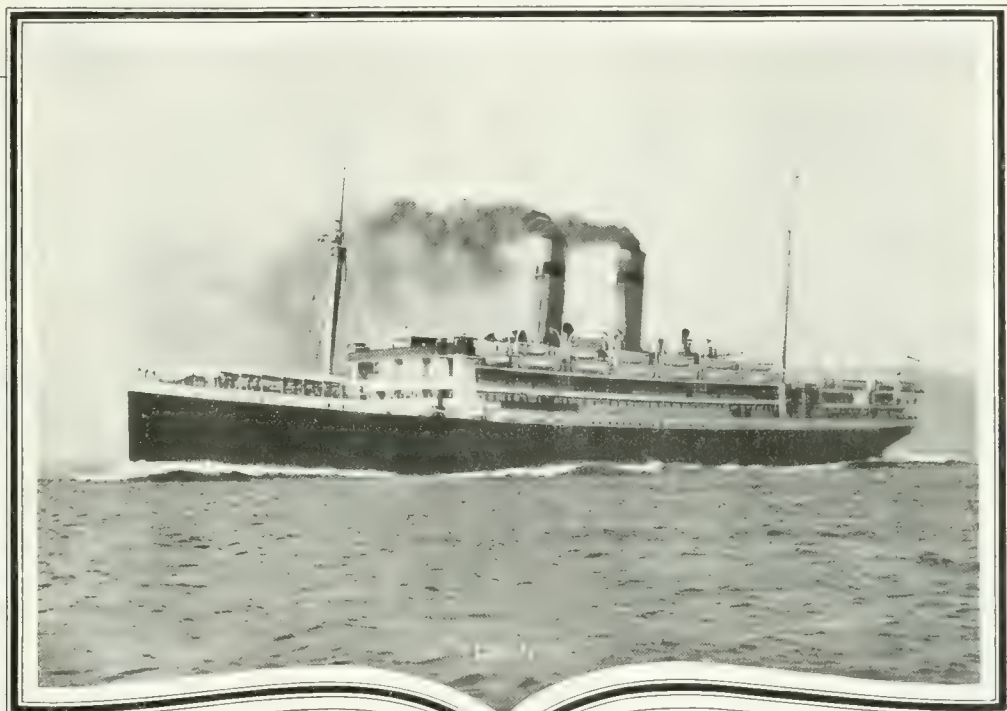

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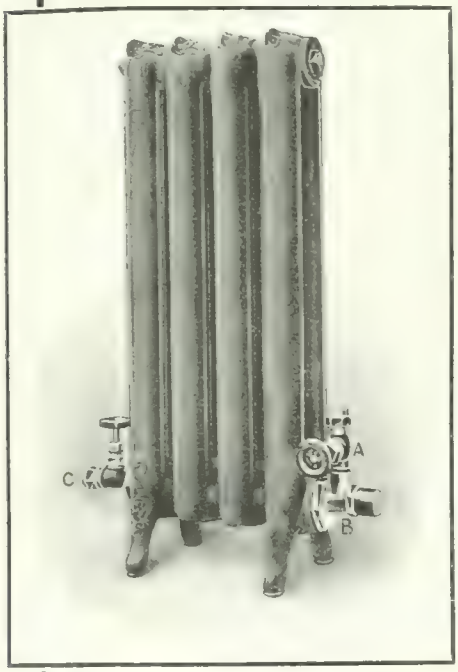

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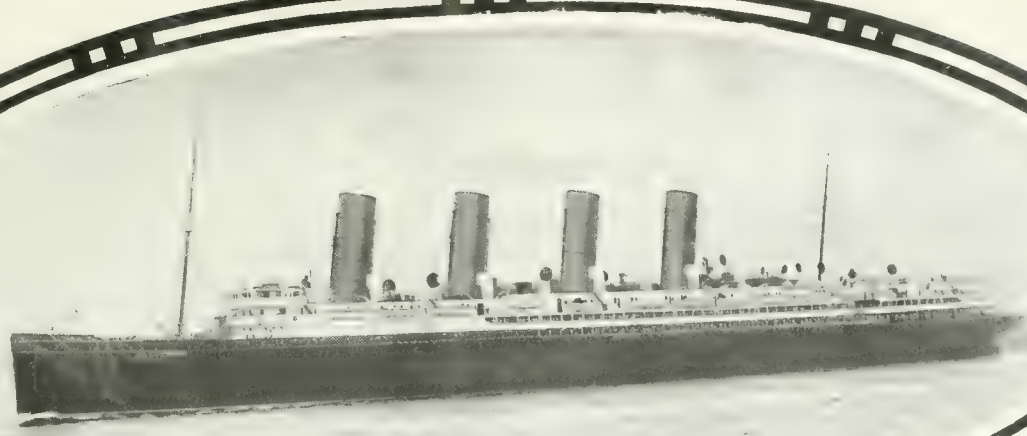

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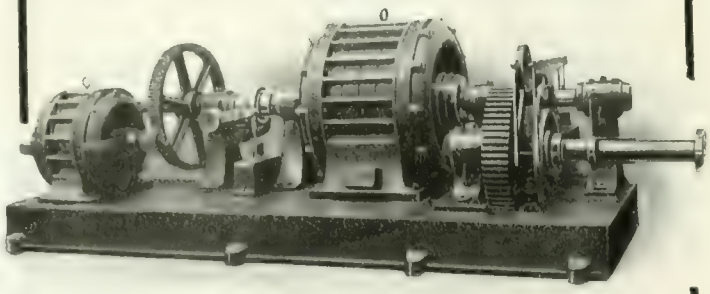

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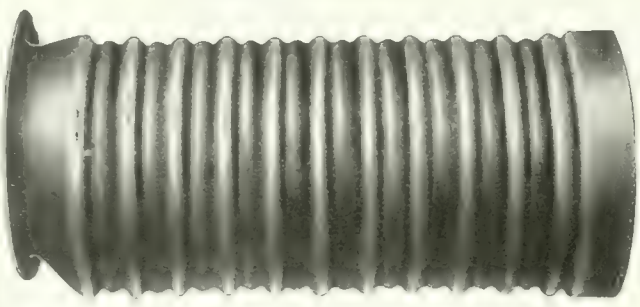

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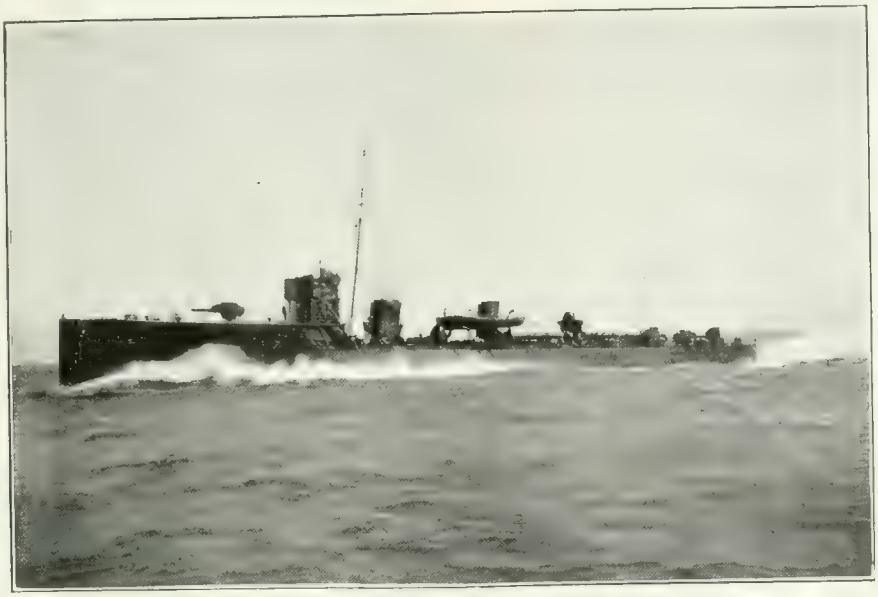

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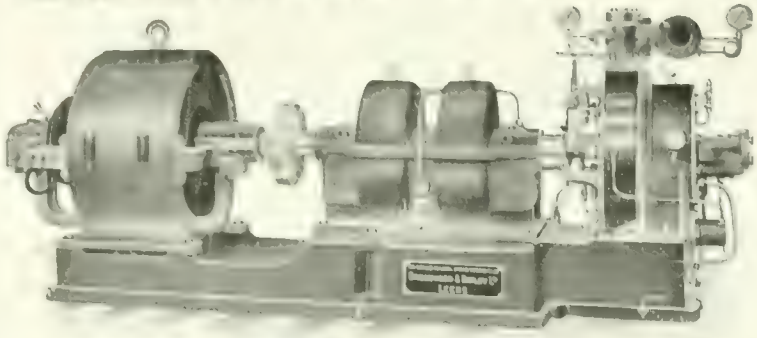

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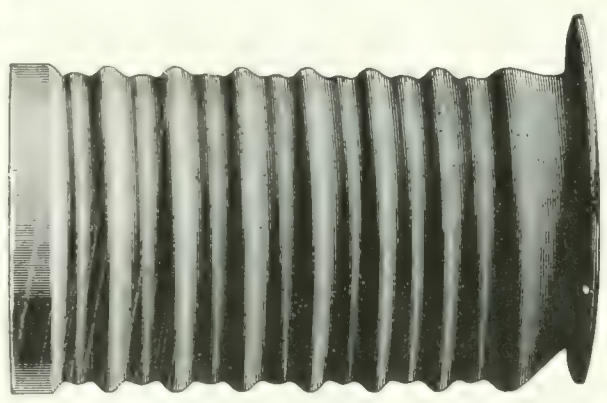

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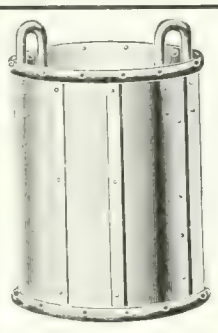

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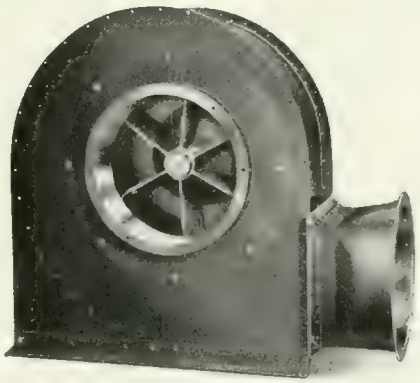

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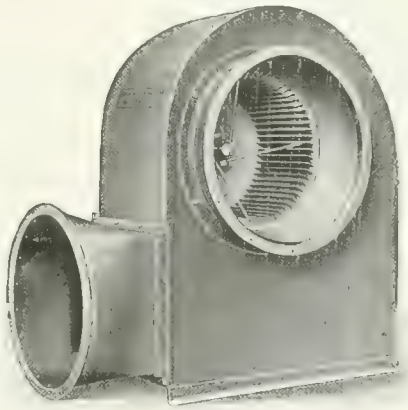

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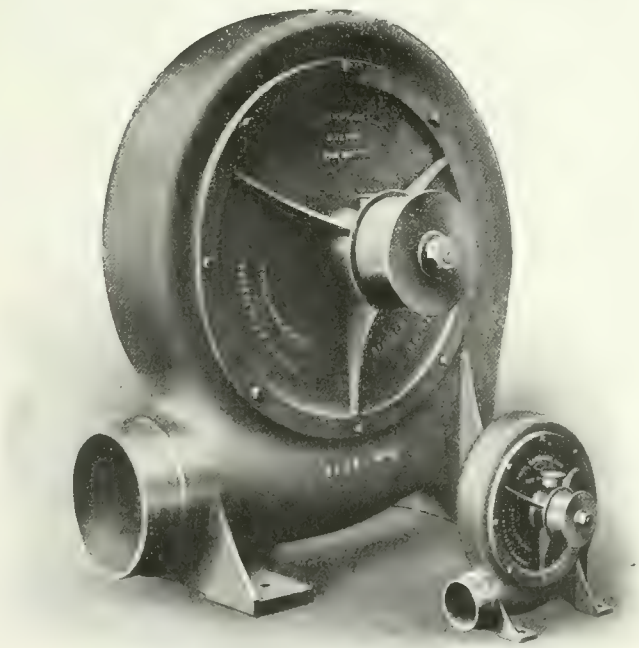

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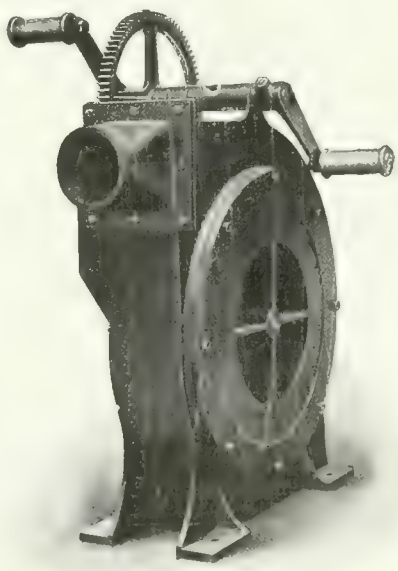

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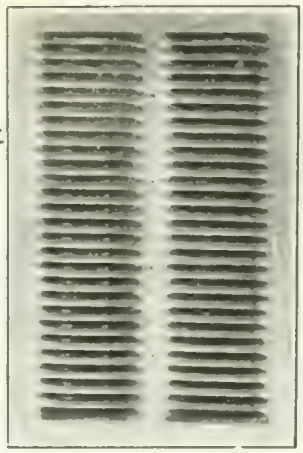

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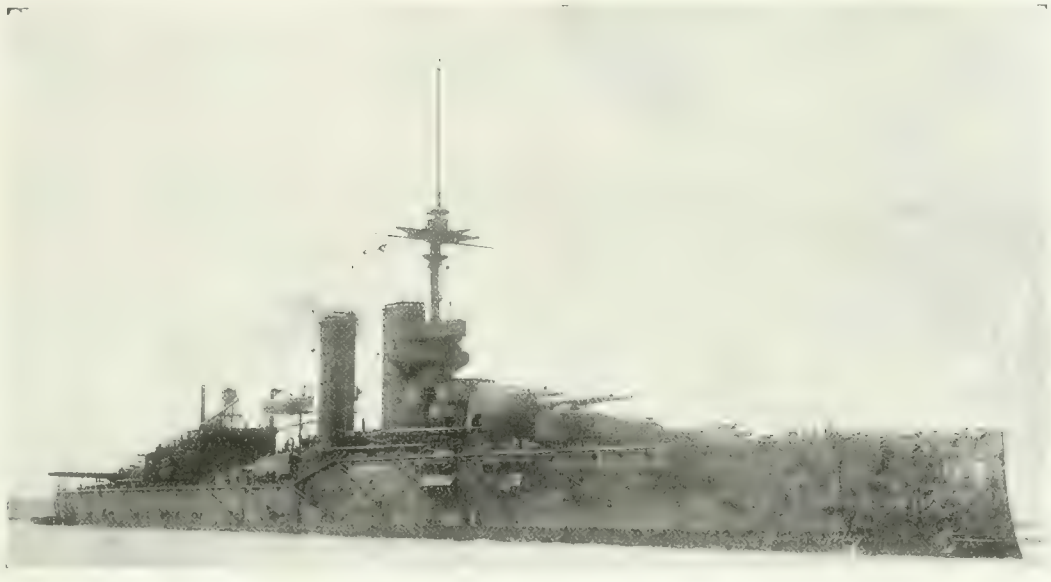

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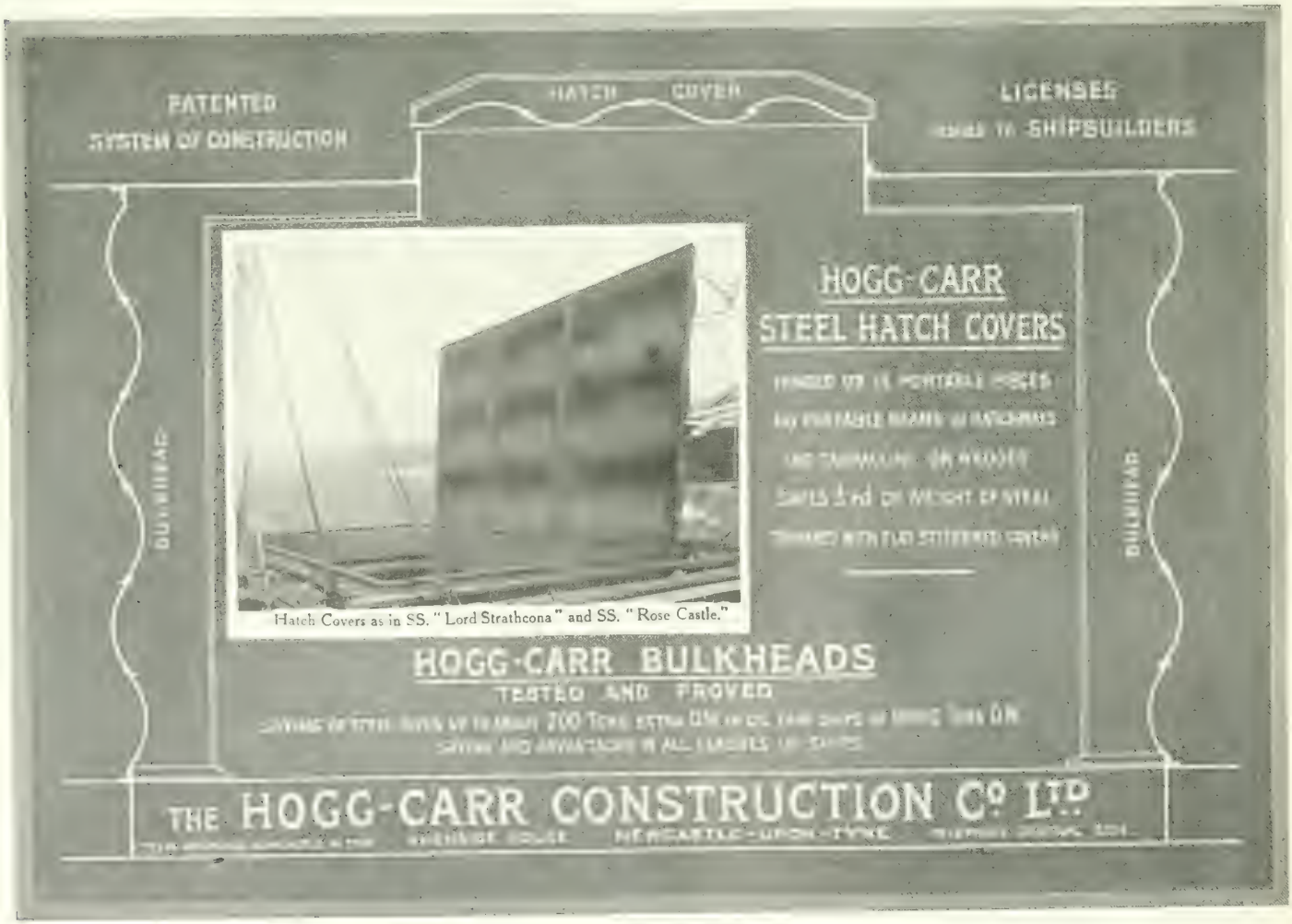

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CONTENTS.

EDITORIALS:
Prize Cargoes and Freight 313
Warranties and Admiralty Charters 313
Delay in Signing Policies 313
Merchant Ships in Hand..... 313
Civil Work's Poor Progress..... 314
Excess Profits Duty..... 314
Australian Shipping..... 314
New U.S. Battleships..... 314
A Subdivision Anomaly..... 314
Ship Calculations..... 315
Heeling Experiment..... 315
Electrical Equipment of a Battleship..... 315
Tests of a Watertube Boiler..... 315
The Clinkering of Coal..... 315
The Bulkheads Committee's Reports..... 316
Oil Firing on Merchant Ships 316
New Submarines for the United States Navy..... 317

ILLUSTRATED:
Collision Damage to the Steamer *Cardiff Hall*..... 325
The Panama Canal Stoppage..... 329

MISCELLANEOUS:
Passengers' Contract Tickets..... 318
Final Report of the Bulkheads Committee..... 319
Protection Against Submarines.... 325

GENERAL NEWS SECTION..... 327

OFFICIAL NOTICES AND SHIP SALES..... 335

SHIPPING SHARE MARKET..... 336

SEVERAL important questions were involved in the case of the *Bilbster* (cargo) decided in the Prize Court last week, but the one which interests us most is the extent to which the shipowner's claim for freight has been recognised.

Prize Cargoes and Freight.

The *Bilbster*, a British vessel, chartered to a German firm, arrived at Antwerp on July 31, 1914, with three consignments of zinc concentrates from Australia. She discharged some 1,978 tons before August 4, on which date, at the orders of her owners, she proceeded to Cardiff, carrying with her 4,730 tons of zinc concentrates, which she did not wait at Antwerp to unload. The owners then sent her to Swansea to discharge. Some of the cargo was consigned to the order of the shippers, the Australian Metal Company, or their assigns, and it was only after a payment of £5,000 by Hy. R. Merton & Co., Ltd., on account of freight, that the shipowners proceeded with the discharge. The cargo was afterwards seized as prize. It was condemned, as the judge found that it was the property of enemy merchants at the time of seizure. What were the rights of the shipowners to freight? Sir Samuel Evans decided that they were entitled to freight as per contract at 22s. 6d. per ton, in all £7,546 10s.; that they were not entitled to £400 for extra use of the ship after she left Antwerp, because the owners ordered her home to protect their own property; and also that they were not entitled to £1,032 for extra expenses of discharging at Swansea, because that port was the choice of the owners but not of the captors. Merton's claimed to have the £5,000 refunded, but that claim the judge disallowed, because the shipowners had done all that they had contracted to do and had given up their lien for freight. Sir Samuel Evans therefore ordered that £2,546 10s. (the balance of the freight after crediting the £5,000 already received) should be paid to the shipowners out of the proceeds of the sale of the cargo.

Owners whose vessels are likely to be chartered by the Admiralty should see that when their insurances are effected they are protected against the warranties in their policies being broken by an Admiralty voyage. A vessel employed by the Government may be sent anywhere at a moment's notice, and a voyage is often completed before notice of it reaches the underwriters. As the Admiralty only assume the war risk on vessels they charter, leaving the marine risk to be covered by the owners, it is necessary that precautions be taken to avoid the vessel being uninsured by the breaking of a warranty. The usual course is to obtain an agreement from the underwriters, by which the vessel is held covered on any voyage made under an Admiralty charter, any breach of warranty being condoned by the payment of an additional premium on receipt of the news of the breach and in the event of any dispute, the concurrence of underwriters on 50 per cent. of the value being binding on the rest.

Warranties and Admiralty Charters.

Both owners and underwriters are complaining of the delay that is being experienced in getting Lloyd's policies signed. The owners are frequently greatly inconvenienced by the lack of the documents, while underwriters complain that as they do not receive their premium till after the policy is signed, they are not getting their money till long after the risk has commenced. There are, or rather were, excellent reasons for this delay; shortage of staff, increase of business and the inexperience of clerical labour taken on to replace those absent on military service. After 14 months of war there has been ample opportunity for making good the deficiencies imposed by exceptional circumstances. This has not been done, as is proved by the fact that during the last fortnight a fleet of over 20 steamers has been signing in "The Room," the inception of the policies having taken place four months ago, while the policies on another fleet, which has been on risk for over six months, have only just been completed.

Delay in Signing Policies.

According to Lloyd's Register there were in course of construction in the United Kingdom on September 30, 432 vessels, of 1,536,177 tons gross, as compared with 442 vessels, of 1,506,925 tons gross, on June 30. In other words, although we are at war, and although our industry is practically concentrated on naval contracts, our stock of mercantile work in hand has increased to the extent of nearly 30,000 tons. At first sight, the average man will probably seek for the cause of the increase in the recent ordering of tankers—which are presumably being built to Lloyd's class. But a number of these vessels are small, and the table "Size of Vessels" shows—or rather will show if its figures be compared with the corresponding figures in the June return—that there is a decrease rather than an increase of vessels of between 100 and 4,000 tons. That does not, of course, prove that vessels within these limits of size have not been begun, because in a speculation of this character vessels launched have to be taken into account. There is no need, however, to take launchings into account in arriving at the conclusion that several fairly large steamers have been laid down during the quarter, for the figures show a definite increase in the number of vessels of between 4,000 and 5,000 tons, 6,000 and 8,000 tons and 10,000

Merchant Ships in Hand.

and 12,000 tons. There are seven more vessels in the first of these groups and four more in the second. A conclusion the ordinary person will be unable to avoid is, we think, that more cargo vessels were urgently wanted before the public was allowed to hear of.

Civil Work's Poor Progress.

Although mercantile shipbuilding is getting a little more attention in the United Kingdom than it did some time ago the progress which is being made is very slow. People who complain that it is slow forget, however, that in the circumstances of the moment it is not possible for anybody to do much better. The Navy has the first call on the industry's service, and everything must stand while it is being obeyed. The workmen—some of them at any rate—are unwilling to go on civil work, even when their labour is not required for naval contracts. Why they should object to be transferred is obscure, although it is undeniable that in times of plentiful employment skilled men deem themselves to be at liberty to take up attitudes which with the conditions less favourable they would not dream of taking up. Further to embarrass the shipbuilder who feels that he might do a little more mercantile work, is a difficulty in obtaining the requisite deliveries of material. The State has had for some time the first claim on steel and makers have probably been unable to do much more than meet its demand. Shipbuilders with civil contracts in hand have hoped that the position would sooner or later take a favourable turn for them. It has not done so to date, and judging from a statement made the other day in Paris by M. Albert Thomas, the French Under-Secretary for Munitions, it is unlikely to do so for some time. M. Thomas said that France and Great Britain had pledged themselves "mutually to devote all their raw material to manufactures for the national defence, relegating to the second place manufactures for private industry." If that is the case we can hardly hope for better progress with mercantile shipbuilding.

Excess Profits Duty.

We have now before us the text of the Finance Bill, and on the face of it we find little to reassure the shipping industry that it will not be grievously hit under the excess profits duty. Certain provisions have been introduced into the measure, which vaguely suggest that in eventualities some special alleviation may be given, but they are not definite enough to dogmatise on freely. For example, under Clause 37, when new capital has been employed since the war a deduction of 6 per cent. will be allowed from the profits on it before the excess profits are calculated. Again, there are certain possibilities in Clause 38. Where a *prima facie* case is made out to the Commissioners of Inland Revenue for an increase of the percentage standard as respects any class of trade or business, machinery is devised by which a Board of Referees may, if they think necessary, substitute a higher percentage standard for a class of trade or business or alter the pre-war standard of profits as the case requires. But we await with interest the elucidation of these provisions before we express a final opinion on them.

Australian Shipping.

Notwithstanding the war, shipping enterprise in the Australian trade has not altogether ceased, and especially on the Inter-State, coastal and American routes there have been signs of considerable activity, although, of course, the situation in this respect has been made difficult by the serious shortage of tonnage. The Commonwealth Government has, as we stated last week, formulated a scheme for the State chartering of vessels, with a view to the control of the overseas shipments of wheat and flour. Until hostilities come to an end it is considered improbable that anything more will be heard of the Federal Navigation Act as an effective measure but, in the meantime, amendments will doubtless be passed by Parliament, though unfortunately it is not believed that they will be of much, if any, relief to shipowners. Since the lighthouse service was taken over by the Commonwealth great improvements have, we understand, been effected, and it is now intended to establish 70 new safeguards in addition to 151 already in existence. As far as can be ascertained, no developments of any importance have recently taken place in connection with the contracts for the carriage of the mails to and from the United Kingdom, but two minor agreements of the kind have been concluded of late—one with the Eastern and Australian Steamship Company for monthly sailings between Melbourne and Port Darwin, and the other with Burns, Philp & Co. for a year's service to the New Hebrides. Pending the settlement of the future of the South Pacific islands captured from Germany, it was considered inadvisable to extend the latter contract for a longer period.

New U.S. Battleships.

The particulars of the new United States battleships have been approved by the Secretary of the Navy. Exclusive of armour and armament, the limit of cost for the two ships authorised March 3 last has been fixed at £1,560,000 each. The total cost of each ship will probably reach £3,000,000. In the new designs particular attention has been paid to defence against attacks by torpedo and air craft and the torpedo nets originally introduced in the United States Navy in the designs of the *Nevada* and *Oklahoma* are retained. The particulars of the new battleships as given by the Navy Department are as follows:—Length overall, 624 ft.; length between perpendiculars, 600 ft.; breadth, 97·8 ft., draught, 30 ft.; speed 20·5 knots; displacement, about 32,000 tons. The main offensive armament will consist of twelve 14-in. guns mounted similarly to the arrangement adopted in the *Pennsylvania* class, or three guns in each of four centre line turrets located two forward and two aft, Nos. 2 and 3 turrets firing over Nos. 1 and 4, respectively. The torpedo defence battery will consist of twenty-two 5-in. Q.F. guns besides four 3-in. guns and anti-aircraft guns firing at an extremely high angle. It is also believed that the design of the turrets has been modified so as to allow of a higher angle of fire. The machinery of the new ships will consist of steam turbines and watertube boilers. It is expected to open tenders from contractors for the building of these ships on November 17 next.

A Subdivision Anomaly.

It will be found that the regulations laid down by the Bulkheads Committee will bring about considerable changes in the spacing of bulkheads from what has hitherto been the average practice. Especially in very large ships will this be the case. A limit to the length of one compartment has been fixed, as also has a limit to that of two adjacent compartments. It is in connection with the latter that a peculiar anomaly arises. The rules say:—"When the factor of subdivision is equal to or less than 0·5, it may be doubled in order to give at any point of the ship's length the total length of two adjacent compartments; but, in that case, the length of the shorter compartment of any pair shall not be less than one-quarter of the length so obtained. . . ." "It should be shown that, throughout the whole length of the vessel, the combined length of each pair of adjacent compartments does not exceed the floodable length multiplied by twice the appropriate factor of subdivision." Suppose, for the sake of illustration, that the subdivision factor is 0·333, *i.e.*, that the vessel is a three-compartment ship. From the curves a certain floodable length is found, and this length multiplied by the appropriate factor of subdivision will give the spacing of bulkheads. It may be desired to have a long and a short compartment adjacent to each other, in which case the total length of these two compartments may be two-thirds the floodable length, and the shorter of the two may be one-fourth of two-thirds of the floodable length. With the long

compartment placed about the centre of the length to be divided, this would give a short compartment, a long one, and then a compartment equal in length to one-third the floodable length, so as to complete the floodable length allowed. But this latter compartment, in conjunction with the long one adjacent, are together greater than two-thirds the floodable length, which is the maximum allowed for two adjacent compartments. Thus by one rule a certain floodable length is permissible and by another it is impossible to take advantage of this floodable length. In effect this means that, unless the spacing of bulkheads in large vessels is almost uniform, the subdivision enforced will be closer than that demanded by the subdivision factor.

Ship Calculations.

Although many instructive papers have been read dealing with the various rules applicable to ship calculations, in only a few yards has much attention been given to these. In the majority of places the calculations necessary for the finding of displacements, metacentres, &c., are done by the use of Simpson's rules, which are much better known than any of the others. Tchebycheff's rules have been extensively used in one or two of the most important yards for several years, and these rules possess many advantages if the work is properly arranged. The main drawback to their adoption is that special ordinates require to be spaced on the lines plan, but this work is quickly accomplished. Tchebycheff's rules are specially suited for stability work. If a body plan be drawn to the specially spaced sections, a continuous reading by integrator round these sections will enable the displacement and moment to be obtained straight away. The stability calculation used to be a long and laborious task, but now it is possible by the use of these rules, and with the help of a planimeter, or better still of an integrator, to accomplish this quickly. Some very concise methods of making stability calculations without the use of these instruments have also been devised. For the ordinary ship calculations, such as displacement, metacentres, position of centre of buoyancy, &c., Tchebycheff's rules are most suitable, and a little preparatory work spent in the arranging of the tables will show that a compactness may be obtained which is not possible when a double application of Simpson's rule is adopted.

Heeling Experiment.

With a given vertical disposition of her movable weights, a ship about to leave port should have so much stability that a given transverse moment produced by the shifting of weights will cause her to heel over to a predetermined angle. One of the wants of to-day is an unobjectionable method of applying such a moment. The discharge of a tank full of water from a compartment at the starboard gunwale into another compartment in the port bilge might suffice. In some small vessels, booms and derricks might be swung to one side. In timber ships, the effect of the last heave of timber lowered upon one side of the deck might be noted. In some cases a line of men might be caused to cross from one side to the other, although this often has its objections in practice. For conveniently measuring the angle of heel, a spirit level with a graduated, slightly curved tube has been used. This instrument may lie on the table in the chart room. How great the moment should be for a given angle of heel is for the naval architect to say. Theoretical men sometimes advocate an elaborate heeling experiment with carefully adjusted weights and long-lined plumbs, but in the case of a ship about to leave port this would generally be impracticable. The application of the moment should be effected as easily and as unostentatiously as possible. By noting the angles produced by the manœuvre with different cargoes the captain would soon accumulate a pile of information for his future use. He would in each case feel safe if the angle did not exceed the limit prescribed. The inventor of a means by which the transverse moment can be set up to the shipmaster's satisfaction will have done much towards the avoidance of mysteries of the sea.

Electrical Equipment of a Battleship.

In a paper entitled the "Electrical Equipment of a Battleship," which was read before the Pittsburg Section of the American Institute of Electrical Engineers, the author, Mr. H. A. Horner, referred to a question which is frequently asked, namely, "Why use motors when the turbine can be directly connected to the propeller shaft?" This is because of the extreme flexibility of the electric drive. With electricity, power can be delivered from several sources, or it can be obtained from one source alone allowing the turbines always to work at an efficient loading. For instance, in emergencies, during manœuvres or during an engagement, as much as 32,000 h.p. is required at the shafts of a big ship, and during ordinary cruising not more than 10,000 h.p. is required. With turbine or reciprocating engine propulsion it is impossible to obtain both outputs at an economical point on the steam consumption curve, especially since the most economical speed of the turbine is very high while the propeller is most efficient at lower speeds. Also with electric drive much closer speed regulations can be obtained than is possible by throttling down the turbines, a point which is very important when a number of ships are manœuvring in line. The most recent use of electricity is for the drive of the main propellers. The battleship *California*, now building, is to be equipped with complete electric propulsion.

Tests of a Watertube Boiler.

In the design of a watertube boiler which has been introduced in America certain special features have been adopted which are claimed to give the boiler a high efficiency and overcome objections that have been brought against the use of such boilers for marine work and especially for the merchant service. The boiler is constructed with large drums so as to increase the water capacity. This feature very much reduced the amount of attention required and also the liability of accidents due to low water. The large steam drum provides a greater surface area of the water for the liberation of steam and a much larger steam space. This latter feature is especially desirable in marine boilers when the vessel is rolling or pitching in rough weather. The tube nests of the boiler are arranged with a large number of tubes in the vertical rows so that baffle plates can be installed and the evaporation tests have shown that the baffling has a great influence upon the circulation of the water in the boiler and, therefore, upon the efficiency. The conclusions indicate that the baffles should be arranged so that the lower tubes in the tube nest are the hottest and the upper ones the coldest and that the lower tubes next to the furnace should be heated to the greatest extent at the lower end next to the water drum. It is probable that the circulation takes place in an up-current through the tubes next to the fire and that this circulation is assisted by heating these tubes the hottest at the lower end so that the steam will pass through the tubes into the steam drum. On the other hand if the tubes are heated at the upper end it probably retards the up-circulation in them.

The Clinkering of Coal.

The paper entitled the Clinkering of Coal by Mr. Lionel F. Marks which appears in the latest issue of the Transactions of the Institute of Marine Engineers shows conclusively that in order to deal with this matter in an adequate manner laboratory tests on coal ash become absolutely necessary. There is a growing feeling that the matter of clinkering ought to be carefully gone into when making contracts for coal and that specifications should include the melting temperature of the ash as indicating the clinkering characteristics of the coal. The only kinds of laboratory tests on coal ash which would seem to be of any real value is one in which the ash is subjected to such temperature as will cause it to melt, either wholly or in part. A number of attempts have been made to determine the melting

temperature of an ash from its chemical analysis but none of these attempts has been satisfactory, nor does it seem probable that this method will ever be available in view of the great complexity of the chemical constitution of coal ash. The determination of the melting temperatures of coal ash is attended with many difficulties, the most important of which is in the definition of the melting temperature. When the material is heated slowly that one of its constituents which is the most fusible will be the first to melt. Its effect upon the rest of the ash will depend upon three factors; (1) the amount of that constituent; (2) its viscocity when melted and (3) its chemical reaction on the remaining constituent.

THE BULKHEADS COMMITTEE'S REPORTS.

With the issue of their second report (see pages 319-24), the Bulkheads Committee have now completed their work. That their findings will please all concerned is improbable, but undoubtedly their recommendations will lead to the greater safety of ships at sea. Vessels built to the new requirements will not be immune from disaster, and doubtless if such takes place there will be those who will ridicule the efforts of the experts who comprised the Committee. It may safely be said that those who know most about sub-division realise the impossibility of constructing ships so as successfully to meet every contingency. The Committee have made no effort to do the impossible. They have devised means whereby vessels will be sub-divided according to size, to the number of passengers carried as determined by the "criterion of service" and to the nature of the trade for which they are intended.

The first report dealt with foreign-going passenger-carrying steamers, which was the most difficult part of the Committee's work. Some time has now elapsed since its appearance, and several criticisms have been made regarding the recommendations contained therein. For example, it has been said why not make ships definitely one, two or three-compartment ships and thus get over the seeming absurdity of having, say, a two-and-a-half compartment ship. To mention such a thing as a two-and-a-half compartment ship in the hearing of a member of the Committee is to raise a hornet's nest. Such a vessel is really a two-compartment ship with a larger margin of safety than is afforded with a sub-division factor of exactly 0·5. This gradation by means of the sub-division factor is really a fine piece of work and gets over the difficulty of such absurd steps as would occur were vessels two-compartment ships up to a certain definite length and three-compartment ships above. Had this idea been introduced, a vessel of, say, 399 ft. in length would have had several bulkheads fewer than one of 401 ft.

The second report is short compared to that preceding, and deals with passenger steamers plying within certain well-defined limits in home waters, and also with cargo vessels. Although these ships plying in home waters make only short voyages, these are made in busy waters not devoid of danger. The wide variation in size and the large number of different types of vessels employed make it impossible to treat their sub-division in anything but a general manner. Exemptions from the recommendations may be made by those in authority when it is clear that the rules would be unnecessary and unreasonable. In this, and the part of the report dealing with cargo ships, it is made manifest that the requirements of the shipowner have been fully considered by the Committee. For cross-channel steamers, which include the bulk of vessels carrying passengers, a very safe standard of sub-division has been set. Vessels with a sub-division factor of 0·5, *i.e.*, able to float with two compartments open to the sea, may be considered fairly safe, and this is to apply throughout to those over 300 ft. in length. Vessels over 200 ft. in length and not exceeding 300 ft. will be two-compartment ships from the fore end to the after bulkhead of the machinery space, and have a sub-division factor of not greater than unity abaft this. Vessels over 100 ft. in length and not over 200 ft. will be so sub-divided that neither the combined length of the two foremost compartments nor the length of any one other compartment shall exceed the floodable length. It will be observed that with this type of ship there has been no attempt made to introduce a varying sub-division factor as that for foreign-going passenger ships. It may well be doubted whether it will be possible to adopt a 0·5 sub-division factor throughout in fast cross-channel steamers of over 300 ft. in length, and from the after machinery bulkhead to the fore end in those over 200 ft. Certainly very few of those at present afloat will conform to the new standards.

Much of the correspondence regarding sub-division which followed the *Titanic* disaster indicated that the safety of cargo ships should also receive consideration from those in authority. The days of the "coffin" ships are past, the beam and the stability of the average cargo ship is now thoroughly satisfactory and comparatively few meet with disaster. Their efficient sub-division is, however, a most difficult problem. The Bulkheads Committee have found it so, and have laid down no such hard-and-fast rules to be adhered to, as they have with foreign-going passenger ships. Two considerations have doubtless brought this about. In the first place, the crews can readily get clear in their boats if their vessels have been in collision, and in the second place the vessels may be built to carry such a cargo that may prohibit the restriction of the lengths of holds. The Committee have no desire to make it impossible to fulfil the requirements of owners, and consequently have left the question of the sub-division of cargo ships practically as it was before. Certain transverse bulkheads are at present demanded by the registration societies, but these are required from considerations of strength and not of floatability. The opinion has been expressed by the Committee that the enforcement of certain standards of sub-division in passenger-carrying ships will have a tendency to cause an improvement in that of purely cargo vessels. Doubtless, wherever possible, efficient sub-division will be striven after, as not only will the lives of the crew be made more secure, but greater safety for the ship and its cargo will thereby be ensured.

Both reports show that thoroughness of investigation and breadth of outlook have been the watchwords of the Committee. They have not been influenced by those who demanded safety at a price which would make commercial success impossible, nor have they forgotten the claims for greater safety of the millions who go down to the sea in ships.

OIL FIRING ON MERCHANT SHIPS.

The main reason why oil firing on merchant ships, as in naval vessels, has not been practicable up to now, is that the supply has not been considered ample or stable enough to ensure the great steamship lines being entirely independent of coal. There have, besides, been other drawbacks, such as the insufficient number of specially designed oil tankers for bringing oil fuel to the main centres of British shipping, and also the lack of the necessary storage facilities at the various ports—two essential considerations for such an important change as is now contemplated. Another development which, in its way, has perhaps hastened a serious consideration of oil firing by the large mercantile shipping companies is the increasing dearness of coal, which for obvious reasons is not likely to get back to the level of pre-war times.

What has so definitely assured a reliable and stable supply of oil fuel for marine power purposes is an arrangement recently entered into between certain British shipping interests and the Mexican Petroleum Company, Ltd., whereby the latter concern will provide all the oil required under a 25 years' contract. These British shipping interests cannot at present be fully given, but there is authority for saying that they include the Cunard Line, and also the numerous steamship enterprises with which Lord Pirrie is associated, among which are the White Star Line, the American Line, the Red Star Line, Atlantic Transport Company, Dominion

Line, Leyland Line, and the National Line. There are to be formed out of these combined interests two British companies, which will build tank stations, refineries, and a large fleet of tank steamers for the transportation of the Mexican Petroleum Company's guaranteed output of oil from Tampico. In one company, which will attend to the transportation and selling, the Mexican Petroleum Company has a one-half share, in the other, which will be the distributing and refining concern, the company has a third interest, the remaining two-thirds being held by the British consuming interests. The 25 years' contract before mentioned involves a supply of Mexican crude output only, and a minimum quantity is stipulated for. While the Mexican Petroleum Company has now a daily output of 30,000 barrels, it has a potential production in Mexico of 200,000 barrels per day, or 30,000 tons, and an annual output of 10,000,000 tons, or approximately 70,000,000 barrels.

The new British companies which will build tank steamers and establish distributing stations in various foreign countries will confine their first efforts to the requirements of this country, but these will be expanded as rapidly as possible. As many as 25 specially designed oil-carrying steamers are known to have been ordered for construction in British shipbuilding yards, but owing to the war many of these vessels are now being built in America. It is interesting to note in this connection that the Petroleum Transport Company, a subsidiary of the Mexican Petroleum Company, has in existence a fleet of six modern tank steamers, and these could be employed to supply the British market. Three more tankers have been ordered from American yards, one of 7,500 tons, one of 10,000 tons, and one of 12,300 tons, and the building of two similar steamers has been entrusted to British yards. These vessels are to be ready for service in 1916. One authority, commenting on this new development, says: "It is not possible at this time to calculate the quantity of oil that will be marketed through the British-Mexican Company, but with the enormous avenues for consumption opened up by the alliance of this company with the great shipping industries, the possibilities can hardly be over-estimated. Once the use of oil is inaugurated in the mercantile marine on a considerable scale, it will extend to a scope that will dwarf in magnitude any existing channel of fuel oil consumption."

The company which will operate the refineries and distributing stations will build works at suitable centres where the various grades of fuel oil will be made, and all the oil fuel furnished to the British-Mexican Company will be manufactured to specifications. The deal does not contemplate the use of petroleum in its crude state for fuel.

These are substantially the main outlines of the agreement with British interests made by President Doheny, and ratified by the board of directors of his company at Los Angelos on May 20 last. Its outstanding feature is that it involves a contract to furnish the British-Mexican Company its requirements of oil at a fixed price for a period of 20 years. A clause in the contract gives the right to cancel five years after the expiration of this period. Thus, in fact, it is a 25 years' contract, the first, it is said, ever made in the oil business covering such a term of years.

Before the deal was entered into, a series of fuel oil experiments were conducted at an expense of £300,000 by a prominent British marine engineer, and it is stated that his tests proved that fuel oil burned under the boilers of steamships has twice the value of coal, and if used in an internal-combustion engine, it has an even higher power value.

If economically considered, the use of liquid fuel on shipboard will require fewer men to be employed, and it has been calculated that on a vessel such as the *Mauretania*, if fitted to use oil fuel, only 27 firemen would be required instead of 312 as at present with coal. Incidentally, it may be stated here that the ill-fated *Lusitania* was one of two or three Cunard steamers that was to be converted to use oil fuel, and it may be presumed that when the war is over the scheme of oil burning that was to be applied to this vessel will be installed in her sister ship, the *Mauretania*.

NEW SUBMARINES FOR THE UNITED STATES NAVY.

TENDERS for the construction of 16 submarines, 5 of which at least are to be built on the Pacific coast, were opened by the U.S. Navy Department on September 30. Submarine designs are not furnished by the Department, the specifications being limited to speed, displacement, accommodation and fuel, and stores requirement. Hitherto, only two shipbuilders, the Electric Boat Company and the Lake Torpedo Company, have competed for the construction of United States submarines, but this year the list was increased by the addition of the Newport News Shipbuilding Company and the New York Shipbuilding Company, the Union Iron Works and the California Shipbuilding Company. The official requirements called for boats of 450 tons displacement on the surface and 500 tons submerged, less than 200 ft. long, with a surface speed of 14 knots and 11 knots submerged, mounting one 3-in. gun, with accommodation for 20 men, equipped for 30 days' cruising and costing not more than $550,000, exclusive of armament and signalling outfit. The time of delivery promised by the tenderers ranged from 12 to 25 months per boat. The Union Iron Works' tender provided for the construction of a 380-ton submarine in 12 months at a contract price of $380,000. Tenders by the Electric Boat Company called for construction of hulls at the plant of the Fore River Shipbuilding Company. One of the tenders made by the Electric Boat Company is for a duplication of the submarine "M-1," which has just been successfully tested at Provincetown, Mass., the largest submarine yet completed for the United States Navy. She has a tonnage of about 550, is about 185 ft. long, has four torpedo tubes and has an anti-aircraft gun. Her design calls for a surface speed of 15 knots.

The Lake Torpedo Boat Company of Bridgeport, Conn., submitted tenders ranging from $345,000 to $532,000; time of delivery 21 or 22 months; surface speed about 14 knots and submerged speed 10½ and 11 knots. The Lake Company agreed to allow the Government to use its patents for the construction of a boat in a Government navy yard at the rate of $100 a ton. The Electric Boat Company agreed to build eight or more boats of certain types for designated prices and in consideration of the contract to allow the Government to build a submarine from its patents for the nominal sum of $1,000 license fee.

Two large companies appearing as builders for submarines for the first time are the New York Shipbuilding Company, of Camden, N.J., and the Newport News Shipbuilding Company, of Newport News, Va. The first agreed to build two boats, one within 24 months and one within 25 months, price $550,000, 490 tons displacement. The Newport News Company put in an almost identical tender. It is understood that these companies will use the Hay-Denny design, which is a British patent. The California Shipbuilding Company of Long Beach, Cal., offered to build not fewer than three or more than five submarines of the Lake type, 485 tons each, deliveries within 23 months, cost $548,000 each. Sloan, Danenhower & Co., of New York, offered specifications for a submarine of the Davidette type to be built by the Government and four boats of the Laurenti type, at $330,000 each. Abner R. Neff submitted a design for a new system of propulsion to be fitted to one boat to be built in a United States dockyard in 16 months for $262,500.

The Neff system of submarine propulsion referred to in the tenders reported above is said to consist of a new method of handling the air supply when the boat is submerged. The storage system is said to be worked out in such a systematic manner that with it the boat has a larger cruising radius under water than by any other system, and the crew is provided with a larger supply of air than by any other system. Just how this is accomplished has not so far been revealed. It is reported, however, that the inventor conducted his experiments in connection with officers of the navy and that the system has reached a remarkable degree of perfection.

PASSENGERS' CONTRACT TICKETS.

The Board of Trade have approved a new form of contract ticket for cabin passengers and steerage passengers in accordance with Section 320 of the Merchant Shipping Act, 1894. The forms must be used on and after October 18 next in substitution of those approved in February of 1912. We reproduce herewith the new forms in question:—

COUNTERPART OF CABIN PASSENGER'S CONTRACT TICKET

[illegible]

Ship [illegible] of [illegible] tons register, to take in passengers at [illegible] for [illegible] on the [illegible] day of [illegible] 19 .

No. of persons	Adults above 12 years and under	Children above 1 and under 12 years	In consideration of the sum of £ [illegible] I hereby agree with the person named in the margin that such person shall be provided with [illegible] class cabin passage in the above-named ship, to sail from the port of [illegible] for the port of [illegible] in [illegible] with not less than [illegible] cubic feet for luggage for each person, and that such person shall be victualled as [illegible] class cabin passenger during the voyage, and the time of detention at any place before its termination; and I further engage to land the person aforesaid with [illegible] luggage, at the last-mentioned port, free of any charge beyond the passage money aforesaid; and I hereby acknowledge to have received the sum of £ [illegible] in [illegible] full / part [illegible] payment of such passage money.
Total No. of persons			

If and so long as the ship is insured against War Risks with a War Risks' Insurance Association, under or in connection with a War Risks' Insurance Scheme of His Majesty's Government, the ship shall have liberty to comply with any orders or directions as to departure, arrival, routes, ports of call, stoppages, or otherwise howsoever given by His Majesty's Government or any Department thereof, or any person acting or purporting to act with the authority of His Majesty, or of His Majesty's Government, or of any Department thereof, or by any Committee or person having, under the terms of the War Risks' Insurance on the ship, the right to give such orders or directions, and if by reason of and in compliance with any such orders or directions anything is done or is not done the same shall not be deemed a deviation.

Signature in full.
Place and date.
[If signed by a broker or agent, state on whose behalf.]

Deposit £ : :
Balance £ : : to be paid at
Total £ : :

This contract ticket is exempt from stamp duty.

CABIN PASSENGER'S CONTRACT TICKET

[illegible]

1. A contract ticket in the form must be given to every person engaging a passage as a cabin passenger in an emigrant ship from the British Islands, to any port out of Europe, and not within the Mediterranean Sea, under a penalty not exceeding £50.
2. Unless the passengers are to have a fixed table, the victualling scale for the voyage must be appended to the contract ticket.
3. All the blanks must be correctly and legibly filled in, and the ticket must be printed in plain and legible characters, and legibly signed with the Christian name and surname and address in full of the person who issues it.
4. The day of the month upon which the ship is to sail must be inserted in words and not in figures only.
5. When once issued, this ticket must not be withdrawn from the passenger, nor any alteration or erasure made in it unless with his consent.
6. Any other terms or conditions of carriage must not be contrary to law or to any of the provisions of this contract ticket.

Ship [illegible] of [illegible] tons register, to sail from [illegible] for [illegible] on the [illegible] day of [illegible] 19 .

No. of persons	Adults above 12 years and under	Children above 1 and under 12 years	In consideration of the sum of £ [illegible], I hereby agree with the person named in the margin that such person shall be provided with [illegible] class cabin passage in the above-named ship, to sail from the port of [illegible] for the port of [illegible] in [illegible] with not less than [illegible] cubic feet for luggage for each person, and that such person shall be victualled as [illegible] class cabin passenger during the voyage, and the time of detention at any place before its termination; and I further engage to land the person aforesaid with [illegible] luggage, at the last-mentioned port free of any charge beyond the passage money aforesaid; and I hereby acknowledge to have received the sum of £ [illegible] in [illegible] full / part [illegible] payment of such passage money.
Total No. of persons			

If and so long as the ship is insured against War Risks with a War Risks' Insurance Association, under or in connection with a War Risks' Insurance Scheme of His Majesty's Government, the ship shall have liberty to comply with any orders or directions as to departure, arrival, routes, ports of call, stoppages, or otherwise howsoever given by His Majesty's Government or any Department thereof, or any person acting or purporting to act with the authority of His Majesty, or of His Majesty's Government, or of any Department thereof, or by any Committee or person having, under the terms of the War Risks' Insurance on the ship, the right to give such orders or directions, and if by reason of and in compliance with any such orders or directions anything is done or is not done the same shall not be deemed a deviation.

Signature in full.
Place and date.
[If signed by a broker or agent, state on whose behalf.]

Deposit £ : :
Balance £ : : to be paid at
Total £ : :

Notice to Cabin Passengers

1. If cabin passengers, through no default of their own, fail to obtain a passage in the ship, and on the day named in this contract ticket, they may obtain redress for breach of contract by summary process under the 321st and 357th Sections of the Merchant Shipping Act, 1894.
2. Cabin passengers must produce, on demand, their contract tickets to the Emigration Officer under a penalty not exceeding £10. This ticket should therefore be preserved and kept in readiness to be produced on board the ship.

This contract ticket is exempt from stamp duty.

Ship [illegible]

Counterpart of steerage passenger's contract ticket.

This part of the contract ticket is to be separated from the other, and to be delivered by the passenger to the Emigration Officer at the port of embarkation, or, in the absence of such Officer, to the Officer of Customs, or to any one appointed by him to receive it, under a penalty not exceeding £10.

CONTRACT TICKET

I engage that the person mentioned below shall be provided with a steerage passage to [illegible] and be landed at the port of [illegible] in the ship [illegible] of [illegible] tons with not less than 10 cubic feet for luggage for each statute adult, and shall be victualled during the whole voyage according to the dietary scale prescribed by law. The ship is to [illegible] to pass [illegible] at [illegible] on the [illegible] day of [illegible] 19 . Passage money, including all charges, except payments for excess bulk or excess value of luggage, as specified in contract ticket £ : : .

If and so long as the ship is insured against War Risks with a War Risks' Insurance Association, under or in connection with a War Risks' Insurance Scheme of His Majesty's Government, the ship shall have liberty to comply with any orders or directions as to departure, arrival, routes, ports of call, stoppages, or otherwise howsoever given by His Majesty's Government or any Department thereof, or any person acting or purporting to act with the authority of His Majesty, or of His Majesty's Government, or of any Department thereof, or by any Committee or person having, under the terms of the War Risks' Insurance on the ship, the right to give such orders or directions, and if by reason of and in compliance with any such orders or directions anything is done or is not done the same shall not be deemed a deviation.

Names.	Ages.	No. of statute adults.
		—

[illegible] souls equal to [illegible] statute adults.

To be signed in full by the person issuing the ticket.

STEERAGE PASSENGER'S CONTRACT TICKET [Not transferable.

These directions and the notice to steerage passengers below, form part of, and must appear on, each contract ticket.

1. A contract ticket in this form must be given to every person engaging a passage as a steerage passenger in any ship proceeding from the British Islands, to any port out of Europe, and not within the Mediterranean Sea, immediately on the payment or deposit by such steerage passenger of the whole or any part of the passage money, for or in respect of the passage engaged.
2. The victualling scale for the voyage must be printed in the body of the ticket.
3. All the blanks must be correctly filled in, and the ticket must be printed in plain and legible characters and legibly signed with the Christian names and surname and address in full of the person who issues it.
4. The day of the month on which the steerage passengers are to embark must be inserted in words and not in figures.
5. When once issued, this ticket must not be withdrawn from the passenger, nor any alteration, addition, or erasure made in it.
6. This ticket is not transferable.
7. A contract ticket shall not contain on the face thereof any condition, stipulation, or exception not contained in this form.

Ship [illegible] of [illegible] tons register, to take in passengers at [illegible] for [illegible] on the [illegible] day of [illegible] 19 .

Names.	Ages.	No. of statute adults.

I engage that the person named in the margin shall be provided with a steerage passage to, and shall be landed at, the port of [illegible] in [illegible] in the ship [illegible] with not less than 10 cubic feet for luggage for each statute adult, and shall be victualled during the voyage and the time of detention at any place before its termination, according to the subjoined scale, for the sum of £ [illegible], including Government dues before embarkation, and head money, if any, at the place of landing, and every other charge, except freight for excess of luggage beyond the quantity above specified, and I hereby acknowledge to have received the sum of £ [illegible] in {full / part} payment. The luggage carried under this engagement, whether in excess of 10 cubic feet or not, shall be deemed to be of a value not exceeding £10, unless the value in excess of that sum be declared and paid for.

If and so long as the ship is insured against War Risks with a War Risks' Insurance Association, under or in connection with a War Risks' Insurance Scheme of His Majesty's Government, the ship shall have liberty to comply with any orders or directions as to departure, arrival, routes, ports of call, stoppages, or otherwise howsoever given by His Majesty's Government or any Department thereof, or any person acting or purporting to act with the authority of His Majesty, or of His Majesty's Government, or of any Department thereof, or by any Committee or person having, under the terms of the War Risks' Insurance on the ship, the right to give such orders or directions, and if by reason of and in compliance with any such orders or directions anything is done or is not done the same shall not be deemed a deviation.

The following quantities, at least, of water and provisions will be supplied by the Master of the ship as required by law, viz.:

(Here insert the statutory dietary scale.)

[If mess utensils and bedding are to be provided by the ship, it must be so stated here.]

Deposit £ : :
Balance £ : : to be paid at
Total £ : :

Signature in full
Place Date
[If signed by a broker or agent, state on whose behalf.]

Notice to Steerage Passengers

1. If steerage passengers, through no default of their own, are not received on board on the day named in their contract tickets, or fail to obtain a passage in the ship, they should apply to the Emigration Officer at the port, who will assist in obtaining redress under the Merchant Shipping Acts.
2. Steerage passengers should carefully keep this part of their contract ticket till after the end of the voyage.

This contract ticket is exempt from stamp duty.

FINAL REPORT OF THE BULKHEADS COMMITTEE.

The Departmental Committee on Bulkheads and Watertight Compartments was appointed in May of 1912 and presented its first report in November of last year. This report dealt with the subdivision of foreign-going passenger steamers and was published officially in two volumes, one containing the text of the report and appendices and the other containing the diagrams. The second and final report which has just been issued deals in general with the application to other types of vessels of the rules formulated in the first report which was dealt with in *Shipbuilding and Shipping Record* of January 7 last (Vol. V, No. 1, pages 4-18).

The terms of reference to the Committee were to advise the Board of Trade :—

(1) As to what in their opinion, would constitute efficient sub-division with regard to each of the classes of vessels included in the rules for life-saving appliances made by the Board of Trade under Section 427 of the Merchant Shipping Act, 1894, having due regard to the nature of the service in which they are respectively engaged.

(2) Whether independently of the foregoing the Committee desire to make any recommendations with reference to the sub-division of vessels already built, or of new vessels, which would, in their opinion, contribute to the safety of life at sea.

In the report now under review the Committee observe that the outbreak of war has somewhat modified their procedure in preparing it. They have had the advantage of taking further evidence from the Engineer Surveyor-in-Chief and the Principal Ship Surveyor of the Board of Trade, and it would no doubt have been practicable in more favourable circumstances to take further evidence from shipowners and others with a view to enabling them to deal in greater detail with some of the matters under their consideration. As explained subsequently, however, treatment in complete detail would have been impracticable even in the most favourable circumstances, and the Committee express confidence that the Authorities will so interpret this report as to make all necessary provision for any special cases.

Since the issue of the first report the Committee have had an opportunity of noting the efficiency under test of a bulkhead constructed in accordance with the tables of scantlings recommended in that report. This opportunity was afforded by William Doxford & Sons, Ltd., of Sunderland, who, for experimental purposes, required to construct a cofferdam. It was arranged that one side of this should be formed of a bulkhead constructed partly with bracketed stiffeners 30 in. apart, and partly with lugged stiffeners 36 in. apart, in each case having scantlings in accordance with the Tables 1 and 2 in the first report.* This bulkhead was 45 ft. broad and 27 ft. deep at the middle, and the whole structure was designed to represent as closely as possible a segment of a single-deck ship with a double bottom. When the cofferdam was filled it was found that the deflection on the stiffeners at mid-depth ranged from $1\frac{1}{4}$ to $1\frac{7}{8}$ in., and the permanent set ranged from $\frac{1}{4}$ to $\frac{3}{8}$ in. The test was carried to a head 8 ft. 6 in. above the top of the bulkhead, involving a load nearly 65 per cent. above that due to the filling of the compartment. At this head the bulkhead was still perfectly effective for the purpose of watertight sub-division, and the ultimate margin of resistance due to the diaphragm value of the structure was not reached. In view of the fact that Table 2 introduces what was practically a new standard of bulkhead stiffening, it was very satisfactory to know that the lugged stiffeners showed themselves to be not less effective than the bracketed stiffeners.

The Committee acknowledge their obligation for the opportunity of obtaining this further valuable evidence in relation to the important question of strength of bulkheads.

Since the first report was published questions as to the application of certain paragraphs in that report have been raised by shipbuilders and others concerned. The Committee have considered such of these questions as have been brought to their notice, and do not find that any important alterations in their first report are necessary. It appears, however, that a few modifications in detail would be desirable in the interests of clearness and completeness, and these are stated later. In all other respects the application of the first report to foreign-going passenger steamers remains unaffected.

For the purpose of this report the following classes of vessels remain to be considered :—

(*a*) Passenger steamers plying within the home trade limits, *i.e.*, the coasts of the United Kingdom, the Channel Islands and Isle of Man, and the continent of Europe between the River Elbe and Brest inclusive. These vessels hold what are termed "Steam 2" passenger certificates issued by the Board of Trade, and are referred to as "St. 2 vessels." In some cases the certificate is limited to a specified voyage ; in others to voyages not exceeding 10 hours in duration. Such certificates are known as "Limited St. 2" certificates, and the vessels as "Limited St. 2 vessels."

(*b*) Passenger steamers plying on short excursions along the coast during daylight and in fine weather between April 1 and October 31.† ("St. 3 vessels.")

(*c*) Passenger steamers plying within partially smooth-water limits.† ("St. 4 vessels.")

(*d*) Passenger steamers plying in smooth water, either in estuaries and lakes, or on rivers and canals.† ("St. 5 vessels.")

(*e*) Cargo steamers, either foreign-going or home-trade.

The rules for life-saving appliances, mentioned in the terms of reference, deal with certain other classes of vessels such as sailing ships with or without passengers, steam launches and motor boats carrying passengers, steam fish carriers, tugs, steam lighters, dredgers, steam hoppers and hulks. The Committee do not consider it necessary to deal with these other classes, though they do not imply that there is no necessity for subdivision in particular examples of such vessels. Thus, decked steam launches or motor boats, if of any considerable size, might require attention in this respect, and tugs might be used to carry passengers, in which case they would come within one of the classes of passenger steamers. Subject to this reservation, the Committee confined their attention to those classes of steamers mentioned above. Their recommendations apply exclusively to new vessels, except as stated under the heading "Existing Passenger Ships" ; and by "new vessels" is meant vessels, the keels of which are laid on or after May 1, 1916.

New Passenger Steamers.

Although the passenger steamers with which the Committee had to deal are divided into four classes, it is important to remember that these classes are not completely separated from each other by sharp lines of division. A few vessels hold all four certificates (St. 2, St. 3, St. 4 and St. 5), and a large number which hold one of the certificates St. 3, St. 4, or St. 5, hold one or both of the other two also. The overlapping between the different classes makes it desirable to bring them as far as possible under the same rules ; and as there is also a similar, though not so marked, overlapping between the St. 2 passenger steamers and the foreign-going vessels dealt with in the First Report, it has seemed advisable to investigate how far the recommendations contained in that Report would apply to the classes of passenger steamers now under consideration.

The St. 2 vessels range from over 350 ft. to under 100 ft. in length ; the St. 3 from over 300 to under 100 ft. ; the St. 4 from 300 to under 50 ft. ; and the St. 5, from over 200 to 30 ft. or less, the smallest

* See *Shipbuilding and Shipping Record*, Vol. V., No. 1, page 14.

† The plying limits for St. 3, St. 4, and St. 5 vessels are set forth in Appendix II of the Board of Trade "Instructions as to the Survey of Passenger Steamers."

being little more than 15 inches, many of them not registered under the Merchant Shipping Acts. Having regard to these wide variations in size, and to the large number of different types included, it is clear that an attempt to deal with the subject in any other than a general manner would be impracticable. The Committee have examined particulars and plans of numerous typical vessels and their recommendations are based on the results of this examination and on their own knowledge. They have, however, only a general application, and it will be necessary to bear this in mind when administering them. In some cases, exemption from certain provisions will be required where the nature of the case would render their application unnecessary or unreasonable. In other cases the standard recommended may not be equal to that followed in the past in regard to special vessels built for a particular service: and in such cases the higher standards hitherto adopted will no doubt be maintained. In short the Committee's recommendations are intended for the ordinary cases which constitute the majority of those under consideration; and it will be for the authorities to decide on the modifications necessary in special cases, including cases where they may recommend modifications in excess of the above-mentioned minima.

In connection with the applicability of the first report to other classes of vessels than foreign-going steamers, those sections of that report which deal with methods of applying requirements do not come into consideration as regards any vessel to which the requirements themselves are not applicable. For example, those paragraphs of the first report which deal with the determination of floodable lengths and the method of finding the permissible length of compartments by multiplying the floodable lengths by a factor of subdivision, would not apply to a vessel which had merely to be fitted with peak and machinery bulkheads, without any requirement as to their spacing.

Subject to the foregoing reservations and to the exceptions and modifications stated in the following paragraphs, the Committee recommend that their first report should apply to the four classes of passenger steamers mentioned under (*a*), (*b*), (*c*), (*d*), and (*e*) *ante*. Where any paragraph of the first report contains a reference to some other paragraph which is modified by this report, the reference shall apply to the paragraph as thus modified. Expressions in the first report such as "at sea" should for the purpose of application to non-seagoing vessels be interpreted as meaning "during navigation."

In the first report reference was made when dealing with the method of determining floodable length to the question of international agreement. The Committee now propose that this reference to international agreement may be omitted from the second part of paragraph 19 of that report.

As regards the floodable length of ships not having a continuous bulkhead deck, the condition as to certain decks being weathertight may be omitted from paragraphs 22 and 23 of the first report in applying them to the vessels mentioned in the second paragraph dealing with the spacing of transverse bulkheads below, especially as regards cross-channel steamers and St. 3, St. 4 and St. 5 vessels.

In determining the floodable lengths of St. 3, St. 4, or St. 5 vessels, the permeability of the whole portions of the vessel forward and aft of the machinery space should be taken at 95 per cent.

As regards the spacing of transverse bulkheads the Committee have examined particulars of a large number of St. 2 passenger steamers, and they find that as regards their general arrangements, and their appropriation to the carriage of passengers and cargo respectively, a large proportion of these vessels resemble the foreign-going passenger steamers dealt with in the first report. In these circumstances, the Committee consider that the vessels of this class should be subdivided in the same manner as foreign-going vessels, *i.e.*, in accordance with paragraphs 33 to 35, 110, 111, and 124 to 128 of that report.

There are, however, some St. 2 passenger steamers which have no exact parallel among the foreign-going vessels, viz., the vessels described in the 1891 report as "cross-channel steamers whose principal employment is the carriage of passengers, or passengers and mails, as, for instance, those running between Holyhead and Dublin or Kingstown, Dover and Calais, Folkestone and Boulogne, Newhaven and Dieppe, Liverpool and Isle of Man." ([C. 6405], page 6.) It is difficult, if not impossible, to define such vessels more precisely, though their character would probably be indicated by a high "criterion permeability," say about 85 per cent.; but they belong to a well known type, and it is not anticipated that in practice there would be serious difficulty in distinguishing them. The Committee of 1890-1 recommended that such vessels, of whatever size, should be subdivided throughout their length so that they might float in moderate weather with any two adjoining compartments in free communication with the sea. The Committee concur with the intention of this recommendation, and consider that it would be reasonable to apply a factor of subdivision not exceeding ·5 to such vessels. In vessels of this type not over 300 ft. in length, where the authorities are satisfied that it is not practicable to apply this factor throughout the whole length of the vessel, relaxation of the condition may be granted.

St. 3, St. 4 and St. 5 vessels are, for the most part, exclusively devoted to the carriage of passengers, and as a rule carry no cargo below the bulkhead deck. In these circumstances it appears reasonable to deal with them in a similar manner to the vessels mentioned in the previous paragraph, making due allowance for the smaller sizes encountered. The Committee therefore recommend the rules contained in the following four paragraphs for St. 3, St. 4 and St. 5 vessels. It will be seen that the enforcement of these rules will necessitate the marking of the subdivision load water-line on all St. 3, St. 4 and St. 5 vessels over 100 ft. in length.

Vessels over 300 ft. in length should be subdivided throughout their length by the application of a factor of subdivision not exceeding ·5.

Vessels over 200 and not over 300 ft. in length should be subdivided by the application of a factor of subdivision not exceeding ·5 from the fore end to the after bulkhead of the machinery space, and by a factor not exceeding unity throughout the remainder of the vessel.

Vessels over 100 and not over 200 ft. in length should be so subdivided that neither the combined length of the two foremost compartments nor the length of any one other compartment shall exceed the floodable length.

Vessels not over 100 ft. in length should be fitted with peak and machinery space bulkheads as required by paragraph 215.

The Committee also recommend that steps should be taken to apply to St. 2, St. 3, St. 4 and St. 5 vessels the principle embodied in paragraph 46 of their first report respecting notation of certificates.

As regards peak and machinery space bulkheads the Committee recommend that paragraph 47* should apply, provided that (1) in the case of paddle steamers, it does not appear necessary to insist on after-peak bulkheads; and (2) in the case of screw steamers, some modification of the rule as to after-peak bulkheads may be permissible so long as suitable provision is made against flooding in the event of damage to the stern tube.

The recommendation in paragraph 48 of the first report dealing with fire-resisting bulkheads should not be compulsorily applied to any of the classes of vessels under consideration.

* Paragraph 47 of the first report reads:

"Ships shall be fitted with a forepeak bulkhead to extend to the bulkhead deck, and to the weather deck in ships having continuous superstructures. This bulkhead shall be placed at a distance of not less than 5 per cent. of the ship's length from the stem at the load water-line.

"An afterpeak bulkhead and bulkheads dividing the machinery space from the cargo and the passenger spaces shall also be fitted and carried up to the bulkhead deck. The afterpeak bulkhead may, however, be stopped below the bulkhead deck, provided that it shall at least be carried to the first deck above the load water-line, and that such deck forms a watertight flat from the afterpeak bulkhead to the stern and also provided that the degree of safety of the ship as regards sub-division is not thereby diminished."

"In all cases stern-tubes should be enclosed in watertight spaces."

Home-trade (St. 2) vessels other than those of the cross-Channel type already referred to, should comply with paragraphs 52 and 69 to 75 of the first report inclusive as regards the fitting of watertight doors. In the case of home-trade (St. 2) vessels of the cross-Channel type, and of St. 3, St. 4 and St. 5 vessels, the Committee believe that, in view of the short passages undertaken, no doors are as a general rule necessary below the bulkhead deck in the machinery space. In cases where the authorities are satisfied that, owing to the length of the passage or for other special reasons, doors are necessary, they should be capable of being closed from the bridge. Doors between passenger spaces, if necessary for the trade in which the vessel is engaged, should be of similar type.

The following should be substituted for sections (*a*) and (*b*) of paragraph 82 of the first report :—

When side scuttles which are capable of being opened are fitted below a deck the underside of which, at its lowest point at side, is less than 7 ft. above the load water-line, they should be of such construction as to prevent unauthorised persons from opening them ; they should be closed and locked before the ship begins any voyage or trip, and they should not be opened during navigation. The time of opening such scuttles in port and of closing and locking them before starting should be entered in the official log-book. In the case of vessels not required to carry official log-books such records should be kept as shall, in the opinion of the authorities, be equally effective in securing compliance with this recommendation.

The remainder of paragraph 82 should apply on the understanding that relaxations may be granted or modifications made in the case of St. 3, St. 4 and St. 5 vessels.

Questions having arisen as to the interpretation of paragraph 84 respecting inlet valve chests, the Committee recommend that, in order to make the matter clear, the words "where necessary to avoid a long neck" should be added. The paragraph in question will then read :—"To prevent the accidental admission of water into the ship owing to the fracture of main or auxiliary inlet valve chests having long necks and fastened directly to the skin of the vessel, these inlet chests should be made as short as practicable and should be attached to special wrought steel boxes built on to the skin of the ship where necessary to avoid a long neck."

The recommendation contained in paragraph 97 of the first report as to the head of water to be applied to watertight doors is intended to apply only to sliding doors. In order to provide for the case of hinged doors, the following words should be substituted for "20 ft." in the fifth line of the paragraph : "20 ft. in the case of sliding doors, and 10 ft. in the case of hinged doors." This modification should apply to doors in foreign-going passenger steamers as well as in the vessels now under consideration.

Means should be adopted for securing by regular trial and inspection that all watertight doors and all other appliances for closing openings which it would be necessary to close in the event of accident are kept in good order and ready for immediate use. In the case of St. 2 vessels, modifications in the requirements of paragraphs 98, 100 and 101 will be requisite in view of the shortness of the passages undertaken. The Committee do not consider it necessary to specify in detail what these modifications should be, but, as a general rule, ordinary sliding doors should be worked at least once a week, and power doors and hinged doors below the bulkhead deck should be tried at least once during each passage, or if this is not practicable, before the commencement of the passage. Further modifications may be necessary in the case of St. 3, St. 4 and St. 5 vessels.

In the case of vessels not carrying official logs arrangements should be made for keeping such equivalent records of the closing of the openings specified in the first report to be closed before the ship leaves port as may be determined by the authorities.

In St. 2 vessels the requirements of paragraphs 105, 106 and 108* should be complied with, except in so far as these vessels are subdivided by a factor of ·5 or under. The Committee do not consider that it will as a rule be practicable to require the fitting of double bottoms in St. 3, St. 4 or St. 5 vessels.

Except in the cross-Channel type of vessels mentioned previously, and except in St. 3, St. 4 and St. 5 vessels, the bulkhead deck should be weathertight, unless there is a deck above it which is weathertight.

A somewhat closer approximation to the actual floodable length curves can be obtained by a slight modification of the method given in Chapter VII of the first report. This consists in substituting $\frac{n_1}{a_1}$ and $\frac{n}{a}$ for n_1 and n respectively in the formulæ for x_1 and M_1 P_1 in paragraph 132, with the consequential alterations in that paragraph and in Table III.

Investigations completed since the date of signing the first report show that it is not necessary to use, in calculating floodable lengths, the special definition of "length" given in paragraph 134 and Table I, and that the definition which is given in the International Convention (*see* paragraph 16 (2)), and adopted generally throughout their report, may be utilised in Chapter VII of that report also. Such alteration is desirable not only in order to avoid having two different definitions, but also because it gives better results in calculating floodable lengths of vessels having cruiser sterns.

The two above-mentioned modifications are therefore recommended for general adoption. The definition of length given in the first line of Table I should read "Extreme length at the load water line" ; and the necessary slight alterations to Table III are embodied in a form printed at the end of the report now under review.

The appended tables (pages 322-23) deal with the strength and construction of bulkheads, and numbered 1A, 2A, 2B, 4A and 5A, should be substituted for the corresponding tables in the first report, in the application of Chapter VIII of that report to the vessels of the cross-Channel type already mentioned, and to St. 3, St. 4 and St. 5 vessels.

The following modifications (*a*), (*b*) and (*c*) in the wording of the first report are proposed in order to express more clearly the Committee's intention in regard to points respecting which misunderstanding might otherwise arise, and are therefore recommended for general adoption, *i.e.*, for application to foreign-going as well as home-tread passenger steamers :—

(*a*) *Plating.*—The word "stokehold or" should be omitted from the second sentence of paragraph 141,† and the following should be inserted before that sentence in order to secure that the thicker plating required in the case of stokehold bulkheads

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* Paragraphs 105, 106 and 108 read :—

105. *Longitudinal Extent* (*Article XXI* (1) *of Convention*).—"In ships 61 m. (equivalent to 200 ft.) and under 76 m. (equivalent to 249 ft.) in length, a double bottom shall be fitted at least from the machinery space to the forepeak bulkhead, or as near thereto as practicable."

(*Article XXI* (2) *of Convention*) —"In ships 76 m. (equivalent to 249 ft.) and under 91·5 m. (equivalent to 300 ft.) in length, a double bottom shall be fitted at least outside of the machinery space and shall extend to the fore and after peak bulkheads respectively, or as near thereto as practicable."

(*Article XXI* (3) *of Convention*).—"In ships 91·5 m. (equivalent to 300 ft.) and over in length, a double bottom shall be fitted amidships and shall extend to the fore and after peak bulkheads respectively, or as near thereto as practicable."

106. *Lateral Extent* (*Article XXI* (4) *of Convention*).—"In ships over 91·5 m. (equivalent to 300 ft.) in length, the inner bottom shall be continued out to the ship's side in such manner as to protect the bilges."

It is considered that the tank top plating should be carried out to the ship's side at a height not less than that at the centre, as specified by the Classification Society, or other authority responsible for the scantlings. Where it is necessary, however, for drainage purposes, the outer edge of the margin plate may be lowered, provided the line of intersection with the bilge plating is not less than 2½ per cent. of the vessel's breadth above the line of the rise of floor.

108. *Wells in Double Bottoms* (*Article XXI* (6) *of Convention*).—"Wells constructed in the double bottom in connection with the drainage arrangements shall not extend downwards from the inner bottom more than half the depth of the double bottom at that point. A well extending to the outer skin is, however, permitted at the after end of the shaft tunnels of screw ships."

† Paragraph 141 reads :—*Plating.*—Transverse bulkheads should be watertight up to the bulkhead deck and should have plating of not less thickness than required by Table 4. Where a bulkhead is at the end of a stokehold or bunker space, the lowest strake should be at least 36 in. high and ·1 in. thicker than given by the table. In all other cases the lowest strake should be at least ·04 in. thicker, except that any limber plates should be ·1 in. thicker.

TABLE 1A.—SIZES OF BULKHEAD STIFFENERS SPACED 30 INCHES APART AND FITTED WITH BRACKET ATTACHMENTS AT TOP AND BOTTOM IN ACCORDANCE WITH TABLE 3. *(The sizes are specified in inches.)*

Vertical Length of Stiffener in Feet	Bulb Angles	0.	2.	4.	6.	8.	10.	12.	14.	16.	18.
6						4 × 3 × ·24	4 × 3 × ·26	4 × 3 × ·30	4 × 3 × ·31	4½ × 3 × ·30	4½ × 3 × ·32
7						4½ × 3 × ·28	4½ × 3 × ·30	4½ × 3 × ·32	5 × 3 × ·30	5 × 3 × ·31	5 × 3 × ·36
8		4 × 3 × ·24	4½ × 3 × ·26	4½ × 3 × ·28	4½ × 3 × ·30	5 × 3 × ·30	5 × 3 × ·30	5 × 3 × ·32	6 × 3 × ·32	5 × 3 × ·30	5 × 3 × ·30
9		4½ × 3 × ·24	4½ × 3 × ·28	4½ × 3 × ·30	5 × 3 × ·30	5½ × 3 × ·30	5½ × 3 × ·34	6 × 3 × ·30	5 × 3 × ·32	5½ × 3 × ·30	5½ × 3 × ·32
10	Angles	5 × 3 × ·28	4½ × 3 × ·30	5 × 3 × ·30	5 × 3 × ·32	6 × 3 × ·30	6 × 3 × ·32	6½ × 3 × ·32	7½ × 3 × ·34	6 × 3 × ·32	6 × 3 × ·34
11		5½ × 3 × ·24	5 × 3 × ·30	5½ × 3 × ·30	6 × 3 × ·30	6½ × 3 × ·30	6½ × 3 × ·32	6 × 3 × ·32	6½ × 3 × ·34	6½ × 3 × ·34	7 × 3 × ·36
12		6 × 3 × ·24	5½ × 3 × ·30	6 × 3 × ·30	6½ × 3 × ·30	6½ × 3 × ·32	6½ × 3 × ·34	6½ × 3 × ·34	7 × 3 × ·36	7 × 3 × ·36	7½ × 3 × ·38
13		6½ × 3 × ·24	6 × 3 × ·30	6½ × 3 × ·30	6½ × 3 × ·32	6½ × 3 × ·34	6½ × 3 × ·36	7 × 3 × ·36	7½ × 3 × ·38	7½ × 3 × ·38	
14		7 × 3 × ·24	6½ × 3 × ·30	6 × 3 × ·32	6½ × 3 × ·34	7 × 3 × ·36	7 × 3 × ·38	7½ × 3 × ·38	8 × 3 × ·40	8 × 3 × ·40	
15		7½ × 3 × ·24	6 × 3 × ·32	6½ × 3 × ·34	7 × 3 × ·36	7 × 3 × ·40	7½ × 3 × ·40	8 × 3 × ·40	8½ × 3 × ·42		
16		8 × 3 × ·24	6½ × 3 × ·34	7 × 3 × ·36	7½ × 3 × ·38	8 × 3 × ·40	8 × 3 × ·40	8½ × 3 × ·42	9 × 3 × ·44		
17		6½ × 3 × ·34	7 × 3 × ·36	7½ × 3 × ·38	8 × 3 × ·40	8½ × 3 × ·42	8½ × 3 × ·44	9 × 3 × ·44			
18		7 × 3 × ·36	7½ × 3 × ·38	8 × 3 × ·40	8½ × 3 × ·42	9 × 3 × ·44	9 × 3 × ·44	9½ × 3½ × ·46			
19		7½ × 3 × ·38	8 × 3 × ·40	8½ × 3 × ·42	9 × 3 × ·44	9 × 3 × ·46	9½ × 3½ × ·46				
20		8 × 3 × ·42	8½ × 3 × ·42	9 × 3 × ·44	9 × 3 × ·46	9½ × 3½ × ·46	10 × 3½ × ·46				

TABLE 2A. SIZES OF BULKHEAD STIFFENERS SPACED 30 INCHES APART AND FITTED WITH LUG ATTACHMENTS AT TOP AND BOTTOM IN ACCORDANCE WITH TABLE 3. *(The sizes are specified in inches.)*

Vertical Length of Stiffener in Feet	Bulb Angles	0.	2.	4.	6.	8.	10.	12.	14.	16.	18.
8						6 × 3 × ·32	6 × 3 × ·38	5½ × 3 × ·30	5½ × 3 × ·34	6 × 3 × ·32	6 × 3 × ·36
9			7 × 3 × ·32	5½ × 3 × ·34	6 × 3 × ·36	5½ × 3 × ·30	5½ × 3 × ·34	6 × 3 × ·32	6½ × 3 × ·34	6½ × 3 × ·36	7 × 3 × ·36
10	Angles	5 × 3 × ·24	5½ × 3 × ·34	6 × 3 × ·38	5½ × 3 × ·32	6 × 3 × ·36	6½ × 3 × ·34	6½ × 3 × ·38	7 × 3 × ·36	7 × 3 × ·42	7½ × 3 × ·38
11		5½ × 3 × ·24	5½ × 3 × ·30	5½ × 3 × ·36	6 × 3 × ·36	6½ × 3 × ·36	7 × 3 × ·36	7 × 3 × ·42	7½ × 3 × ·40	8 × 3 × ·40	8 × 3 × ·44
12		6 × 3 × ·36	6 × 3 × ·32	6 × 3 × ·38	6½ × 3 × ·40	7 × 3 × ·40	7½ × 3 × ·38	7½ × 3 × ·48	8 × 3 × ·44	8½ × 3 × ·44	9 × 3 × ·44
13		6 × 3 × ·32	6½ × 3 × ·34	6½ × 3 × ·42	7 × 3 × ·42	7½ × 3 × ·42	8 × 3 × ·42	8½ × 3 × ·42	9 × 3 × ·42	9 × 3 × ·48	
14		6½ × 3 × ·34	7 × 3 × ·36	7½ × 3 × ·38	8 × 3 × ·40	8½ × 3 × ·42	9 × 3 × ·44	9 × 3 × ·46	9½ × 3½ × ·45	9½ × 3½ × ·50	
15		6½ × 3 × ·38	7½ × 3 × ·38	8 × 3 × ·40	8½ × 3 × ·42	9 × 3 × ·44	9½ × 3½ × ·45	9½ × 3½ × ·48	10 × 3½ × ·48		
16	Bulb Angles	7 × 3 × ·40	8 × 3 × ·40	8½ × 3 × ·42	9 × 3 × ·44	9½ × 3½ × ·45	10 × 3½ × ·46	10½ × 3½ × ·46	11 × 3½ × ·48		
17		7½ × 3 × ·42	8½ × 3 × ·42	9 × 3 × ·44	9½ × 3½ × ·45	10 × 3½ × ·46	10½ × 3½ × ·48	11 × 3½ × ·48			
18		8½ × 3 × ·42	9 × 3 × ·44	9½ × 3½ × ·45	10 × 3½ × ·48	11 × 3½ × ·48	11 × 3½ × ·52	12 × 3½ × ·50			
19		9 × 3 × ·44	9½ × 3½ × ·45	10 × 3½ × ·48	11 × 3½ × ·48	11 × 3½ × ·54	12 × 3½ × ·50				
20		9½ × 3½ × ·45	10 × 3½ × ·48	11 × 3½ × ·48	11 × 3½ × ·54	12 × 3½ × ·50	12 × 3½ × ·58				

TABLE 2B.—SIZES OF BULKHEAD STIFFENERS SPACED 30 INCHES APART, NOT FITTED WITH BRACKET OR LUG ATTACHMENTS. *(The sizes are specified in inches.)*

Vertical Length of Stiffener in Feet	Bulb Angles	0.	2.	4.	6.	8.	10.	12.	14.	16.	18.
6		3 × 2½ × ·22	3½ × 2½ × ·26	4 × 2½ × ·28	4 × 3 × ·32	4½ × 3 × ·32	5 × 3 × ·32	5½ × 3 × ·32	5½ × 3 × ·36	6 × 3 × ·34	6 × 3 × ·38
7		3½ × 2½ × ·24	4 × 2½ × ·28	4½ × 3 × ·30	5 × 3 × ·32	5½ × 3 × ·32	6 × 3 × ·32	6 × 3 × ·38	5½ × 3 × ·30	5½ × 3 × ·32	6 × 3 × ·32
8	Angles	4 × 2½ × ·24	4½ × 3 × ·30	5 × 3 × ·34	6 × 3 × ·32	6 × 3 × ·38	5½ × 3 × ·30	6 × 3 × ·32	6 × 3 × ·34	6½ × 3 × ·34	6½ × 3 × ·36
9		4½ × 3 × ·30	5½ × 3 × ·32	6 × 3 × ·34	5½ × 3 × ·30	6 × 3 × ·32	6 × 3 × ·36	6½ × 3 × ·34	7 × 3 × ·36	7 × 3 × ·38	7½ × 3 × ·38
10		5½ × 3 × ·30	6 × 3 × ·34	5½ × 3 × ·30	6 × 3 × ·32	6½ × 3 × ·34	7 × 3 × ·36	7 × 3 × ·38	7½ × 3 × ·38	7½ × 3 × ·40	8 × 3 × ·40
11		6 × 3 × ·32	5½ × 3 × ·30	6 × 3 × ·34	6½ × 3 × ·36	7 × 3 × ·36	7½ × 3 × ·38	7½ × 3 × ·42	8 × 3 × ·42	8½ × 3 × ·42	8½ × 3 × ·48
12		5½ × 3 × ·30	6 × 3 × ·34	6½ × 3 × ·36	7 × 3 × ·40	7½ × 3 × ·40	8 × 3 × ·40	8½ × 3 × ·42	8½ × 3 × ·48	9 × 3 × ·46	9½ × 3½ × ·46
13		6 × 3 × ·32	6½ × 3 × ·36	7 × 3 × ·40	7½ × 3 × ·42	8 × 3 × ·44	8½ × 3 × ·46	9 × 3 × ·44	9 × 3 × ·46	10 × 3½ × ·46	
14		6½ × 3 × ·34	7 × 3 × ·40	8 × 3 × ·40	8½ × 3 × ·42	9 × 3 × ·44	9 × 3 × ·50	9½ × 3½ × ·48	10 × 3½ × ·48	10½ × 3½ × ·46	
15		7 × 3 × ·38	8 × 3 × ·40	8½ × 3 × ·40	9 × 3 × ·44	9½ × 3½ × ·46	10 × 3½ × ·46	10½ × 3½ × ·46	11 × 3½ × ·48		
16	Bulb Angles	7½ × 3 × ·44	8½ × 3 × ·42	9 × 3 × ·44	9½ × 3½ × ·46	10 × 3½ × ·46	10½ × 3½ × ·50	11½ × 3½ × ·48	11½ × 3½ × ·50		
17		8 × 3 × ·44	9 × 3 × ·44	9½ × 3½ × ·46	10 × 3½ × ·50	11 × 3½ × ·48	11½ × 3½ × ·48	11½ × 3½ × ·54			
18		9 × 3 × ·44	9½ × 3½ × ·46	10 × 3½ × ·50	11 × 3½ × ·48	11½ × 3½ × ·48	12 × 3½ × ·50	12 × 3½ × ·58			
19		9½ × 3½ × ·46	10 × 3½ × ·48	10½ × 3½ × ·48	11½ × 3½ × ·50	12 × 3½ × ·50	Channel 12 × 3½ × 3½ × ·46 & ·62				
20		10 × 3½ × ·46	10½ × 3½ × ·48	11½ × 3½ × ·48	12 × 3½ × ·52	Channel 12 × 3½ × 3½ × ·46 & ·62	12 × 4 × 4 × ·48 & ·62				

The ends of the stiffeners are to be riveted to the bulkhead boundary angles.
Sizes for intermediate lengths of stiffener and heights of bulkhead deck should be obtained by interpolation.
Sizes of stiffeners are based on British Standard sections.
In the case of channel sections the upper thickness is that of the web and the lower thickness that of the flange.

shall extend to the position where corrosion is most likely to occur :—

"Where a bulkhead is at the end of a stokehold space, the lower part of the bulkhead plating, to a height at least 24 in. above the stokehold floor, should be at least ·1 in. thicker than given by the Table."

TABLE 4A.—THICKNESSES OF PLATING.

Bulkhead plating. Stiffeners spaced 30 in. apart.			Tunnel plating. Stiffeners spaced 36 in. apart.		
Depth at middle line, from bulkhead deck to lower edge of plate, in feet.		Thickness, in inches.	Depth at middle line, from bulkhead deck to lower edge of plate, in feet.		Thickness, in inches.
Above.	Not above.		Above.	Not above.	
	7	·18	—	8	·22
7	9	·20	8	10	·24
9	11	·22	10	12	·26
11	14	·24	12	14	·28
14	16·5	·26	14	16	·30
16·5	19	·28	16	18	·32
19	22	·30	18	21	·34
22	25	·32	21	23	·36
—	—		23	26	·38
25	28	·34	26	29	·40
28	31	·36	29	31·5	·42

(*b*) *Boundary angles.*—Paragraph 142 should read as follows :—

"Boundary angles may be single, and should be at least ·1 in. thicker than the bulkhead plating required by the table."

(*c*) *Stiffeners.*—The words "connected to the inner bottom plating" should be inserted after "stiffeners" in the ninth line of paragraph 143.*

Paragraphs 168 to 173 inclusive, dealing with the number and kind of pumps, should not apply to St. 2, St. 3, St. 4 or St. 5 vessels, which should be provided with pumps as follows :

(A) —

Length of Vessel.	Pumps required.	
Under 250 ft.	One power bilge pump independent of the main engine	One pump of the Downton or cranked type.
250 and under 300 ft.	One ditto	Two ditto.
300 and over	Two ditto	

The pumps mentioned in the third column may be dispensed with if the number of power pumps independent of the main engine exceeds that stated in the second column, and provided Section (C) of this paragraph is complied with.

(B) Each of the pumps required by Section (A) should be arranged to draw from all compartments. Each of the power pumps should be capable of giving a speed of water through the largest pipes of not less than 400 ft. per minute under ordinary working conditions, and should have a separate direct suction in the compartment in which it is situated of the full size of the pump inlet.

(C) Where two independent power pumps are required, one pump should be worked from a source of power which is available at all times when the ship is occupied by passengers or crew independently of the main propelling plant. For this purpose the source of power should be situated above the bulkhead deck.

(D) A power pump is one driven by steam, electricity or other mechanical power, not by manual labour.

(E) The pumps specified in Section (A) should, in the case of vessels of 200 ft. in length or over, be additional to the ordinary bilge pump on the main engine or its equivalent engine-room pump.

Paragraph 187 of the first report, which relates to international agreement, does not apply.

Certain questions have been raised as to the interpretation of paragraphs 185 and 190, respecting the provision of an independent source of power above the bulkhead deck, and particularly as to the relation of those paragraphs to other portions of the report. In view of these questions and of the fact that an independent source of power will, in practice, be fitted owing to the operation of paragraph 171, and also no doubt in connection with wireless telegraphy installations, the Committee see no objection to paragraphs 185 and 190 being omitted from any regulations which may be made for the purpose of carrying their first report into effect.

The regulations embodied in paragraph 192 of the first report relating to emergency stores should not be compulsorily applied to any of the vessels under consideration in the second report.

TABLE 5A.—SIZES OF TUNNEL STIFFENERS SPACED 36 IN. APART.

(*The sizes are specified in inches.*)

Mean height from base of tunnel to bulkhead deck, in feet.	Height from base of tunnel to top of flat side, in feet.						
	3 ft.	3 ft. 6 in.	4 ft.	4 ft. 6 in.	5 ft.	5 ft. 6 in.	6 ft.
8	$2\frac{1}{2} \times 2\frac{1}{2} \times ·20$	$2\frac{1}{2} \times 2\frac{1}{2} \times ·24$	$3 \times 2\frac{1}{2} \times ·22$	—	—		
12	$2\frac{1}{2} \times 2\frac{1}{2} \times ·24$	$3 \times 2\frac{1}{2} \times ·26$	$3\frac{1}{2} \times 2\frac{1}{2} \times ·24$	$4 \times 2\frac{1}{2} \times ·24$	$4 \times 2\frac{1}{2} \times ·28$	$4 \times 3 \times ·30$	—
16	$3 \times 2\frac{1}{2} \times ·24$	$3\frac{1}{2} \times 2\frac{1}{2} \times ·26$	$4 \times 2\frac{1}{2} \times ·26$	$4 \times 3 \times ·32$	$4\frac{1}{2} \times 3 \times ·32$	$5 \times 3 \times ·32$	$5 \times 3 \times ·38$
20	$3\frac{1}{2} \times 2\frac{1}{2} \times ·24$	$4 \times 2\frac{1}{2} \times ·26$	$4 \times 3 \times ·32$	$4\frac{1}{2} \times 3 \times ·34$	$5 \times 3 \times ·32$	$5\frac{1}{2} \times 3 \times ·34$	$5\frac{1}{2} \times 3 \times ·40$
24	$3\frac{1}{2} \times 2\frac{1}{2} \times ·30$	$4 \times 3 \times ·30$	$4\frac{1}{2} \times 3 \times ·32$	$5 \times 3 \times ·32$	$5\frac{1}{2} \times 3 \times ·32$	$6 \times 3 \times ·34$	$6 \times 3 \times ·40$
28	$4 \times 2\frac{1}{2} \times ·28$	$4\frac{1}{2} \times 3 \times ·30$	$4\frac{1}{2} \times 3 \times ·38$	$5 \times 3 \times ·38$	$5\frac{1}{2} \times 3 \times ·38$	$6 \times 3 \times ·40$	$5\frac{1}{2} \times 3 \times ·32$ B.A.

The ends of tunnel stiffeners are to be riveted to the tunnel boundary angles.
Sizes for intermediate heights of flat side and heights of bulkhead deck should be obtained by interpolation.

* Paragraph 143 reads :—*Stiffeners* should be in accordance with Tables 1 or 2 in association with a spacing of 30 in. Other forms of stiffener may be adopted if they provide not less strength and stiffness than those tabulated, and the spacing of stiffeners may be increased up to a maximum of 36 in., provided they be correspondingly increased in strength and stiffness. The lower end of each stiffener should be attached to the shell plating, to the inner bottom plating or to efficient horizontal plating. At each deck level which forms the top of a system of stiffeners, plating should be provided of a character which will ensure horizontal rigidity in the bulkhead. In the case of hold stiffeners the lower bracket or its connecting angle should extend over the floor adjacent to the bulkhead and this should be a solid floor; the upper bracket should be connected to angles which extend over the beam space or to the beam adjacent to the bulkhead, or other effective means should be adopted for securing the necessary structural rigidity at these parts. Where it is impracticable to carry out the provisions of the tables as to bracketing, &c., equivalent strength should be provided in all cases. Where stiffeners are cut in way of watertight doors in the lower part of a bulkhead the opening should be suitably framed and bracketed, and a tapered web plate or buttress, stiffened on its edge, should be fitted at each side of the door from the base of the bulkhead to well above the door opening. Where stiffeners are not cut, but where the space between stiffeners has to be increased on account of watertight doors in 'tween deck bulkheads, the stiffeners at the sides of the doorway should be increased in depth and strength so as to provide efficiency at this neighbourhood at least equal to that of the unpierced bulkhead, without taking the door-frame into consideration. The frames of watertight doors should be well fitted and strongly connected to the bulkhead.

EXISTING PASSENGER STEAMERS.

"Existing ships" are those the keels of which were laid before May 1, 1916.

Paragraph 180*, relating to the strength of bulkheads, should apply with the substitution of the tables appended to this report for the corresponding tables appended to the first report) to home trade "St. 2" passenger steamers, but not to the other classes.

The recommendations respecting the periodical operation and inspection of watertight doors, &c., should apply to existing ships.

The time within which alterations should be made has been altered—May 1, 1916, should be substituted for July 1, 1915, in the application of paragraph 186.†

CARGO STEAMERS.

Cargo steamers are with few exceptions built under the supervision of a Classification Society and in accordance with its rules. These rules contain requirements as to the fitting of bulkheads, and experience shows that bulkheads fitted in accordance with these requirements have been the means of saving ships from foundering. The rules do not, however, specify the precise positions in which the bulkheads should be fitted. The spacing of the bulkheads is thus generally determined in practice by the owners' requirements or desires as to the lengths of the different holds, and the bulkheads are therefore not necessarily of their full value from the point of view of keeping the ship afloat should a compartment be holed. Further, the practice of the societies, while always maintaining the forepeak and machinery bulkheads and requiring stern tubes to be enclosed in watertight spaces, permits of other bulkheads being omitted altogether or curtailed in height, provided adequate compensation is made in regard to strength. This is no doubt due to the fact that it is sometimes necessary to construct vessels of special design for special trades, and there are cases where the special arrangements adopted would be seriously interfered with if transverse bulkheads were fitted in the cargo spaces.

The Committee do not desire to hamper unnecessarily the evolution of special designs of ships under proper control, but they consider that the omission of bulkheads which are specified by the rules of the Classification Societies should be strictly confined to special cases where such omission is unavoidable, having regard to the service of the vessel.

They further consider that the bulkheads fitted in new cargo steamers should be so constructed as to have equivalent efficiency to those built in accordance with Tables 1 to 5 in the first report‡ and should be so spaced as to secure the greatest possible measure of safety consistent with the requirements of the service in which the vessel is to be engaged. The Committee further believe that the enforcement on passenger steamers of the standards of subdivision recommended in their first report will in itself tend to cause an improvement in the sub-division of cargo steamers, especially those of the larger size; but apart from this, they are of opinion that the question of the systematic spacing of the bulkheads in all new cargo steamers should receive the careful consideration of shipowners and builders, as there cannot fail to be many cases where attention to this point will greatly increase the protection afforded by the bulkheads which would be fitted in any case for other reasons, and will thus secure a good measure of safety. The method of determining floodable lengths explained in their first report will enable the most advantageous spacing to be readily determined, and in order to simplify the procedure as much as possible, a permeability of 60 per cent. might be assumed throughout the whole space forward and aft of the machinery space, including the double bottom.

In conclusion, the Committee record their high appreciation of the assistance rendered by Mr. Walter Carter, their secretary. The discussions were frequently of a highly technical character and Mr. Carter's power of quickly grasping the essential points, and his assistance in finding words to express the exact meaning intended, were an invaluable help in the preparation of their Minutes and in the drafting and revision of their reports.

The report is signed by Sir Archibald Denny, Bart., LL.D., (Chairman), Mr. Jas. Bain, Mr. C. Buchanan, Mr. H. R. Champness, M.V.O., Dr. G. B. Hunter, Mr. Summers Hunter, Mr. J. Foster King, Mr. Andrew Laing, Mr. W. J. Luke and Prof. J. J. Welch.

* Paragraph 180 reads:—*Strength of Bulkheads.*—The Committee are satisfied that the plating and stiffening of existing bulkheads will in general provide sufficient strength to withstand water pressure up to the top of the bulkhead, although their stiffness may be less than is now recommended for new bulkheads. Under these circumstances, where the stiffeners are considerably below the standard of the new Tables (Chapter VIII), and except where bulkheads are extended to a higher level than that for which they were originally designed, a general raising of the standard of strength for existing bulkheads to that of the tables is unnecessary, provided the bracket attachments are effective or are made effective, and the bulkhead is put in good repair. In all cases the arrangements in way of watertight doors should be carefully examined and the stiffness of the structure reinforced where necessary.

† Paragraph 186 reads:—*Time within which alterations should be made.*—It is suggested that the existing arrangements on each vessel should be considered when it comes up for survey for passenger certificate in the ordinary course. It will be necessary, in all cases in which alterations are required in accordance with the foregoing paragraphs, to allow the owners a reasonable period within which to carry them out. Except where otherwise stated therein, the recommendations are subject to the condition that alterations need not be completed, in the case of classed vessels, before the second periodical survey from the date on which the Convention comes into force, and in the case of unclassed vessels, before the end of a corresponding period which might be fixed with reference to the load-line survey. This condition means that the alterations would not have to be completed before the expiry of four years, and would not be delayed beyond eight years from July 1, 1915. It may be found that the existing arrangements of some vessels are such as to make it permissible for their further consideration to be postponed until the other cases have been dealt with.

‡ See *Shipbuilding and Shipping Record*, Vol. V, No. 1, p. 14 *et seq.*

COMPANY REGISTRATIONS.

Cargo Coasters, Ltd.—Capital, £3,000 in £1 shares. Objects, to carry on the business of shipowners, ship brokers, charterers of ships, lightermen, &c. B. P. Thomas, 116, Dock Street, Newport, Mon., is permanent managing director, subject to holding £100 shares. Private company.

"Egad," Tug, Ltd.—Capital, £5,100 in £10 shares. Objects, to acquire the steam tug *Egad* or any share therein, and to adopt an agreement with Coggins & Griffith, Ltd. First managing directors, T. C. Coggins and G. Griffith. Registered office, Borough Buildings, 7, Rumford Street, Liverpool. Private company.

Andersons Slipway, Ltd.—Capital, £2,000 in £1 shares. Objects to take over the business of a boat builder and ship repairer carried on by John Anderson at Friars Goose, Felling R.S.O. Durham, as "John Anderson." First directors, J. Anderson (managing director), J. Cooper, G. W. Todd, W. M. Brown, W. Matheson and I. R., Matheson. Private company.

Kymo Shipping Company, Ltd.—Capital, £3,000 in £1 shares. Objects, to acquire the steamship *Danehurst* with tackle, apparel and furniture, and/or any other steamship or steamships or other vessels or craft of all kinds, and to carry on the business of shipbuilders and repairers. Signatories (who appoint the first directors), T. Nottingham, 59, Dunluce Street, Liverpool, and T. A. Lawrenson, 1, Glenwyllin Road, Waterloo. Private company.

Garth Shipping Company, Ltd.—Capital, £50,000 in £1 shares. Objects, to take over the steamships *Aysgarth*, *Elmsgarth* and *Ferngarth*, and to carry on the business of shipowners and brokers, wharfingers, &c., and to adopt an agreement with L. Macarthy, who is the first managing director. Qualification, £100. Registered office, Moor Buildings, 54, Pilgrim Street, Newcastle-on-Tyne. Private company.

Euxinos Shipping Company, Ltd.—Capital, £100 in £1 shares. Objects, to purchase, charter or otherwise acquire, contract for the building of, equip, maintain, alter, sell, let out on hire, trade with, exchange, dispose of and deal with ships and vessels of all kinds, &c. Signatories, F. K. Robertson, 151, Ferne Park Road, Crouch End, N., and L. G. Godfrey, 77, Norfolk House Road, Streatham, S.W. Private company.

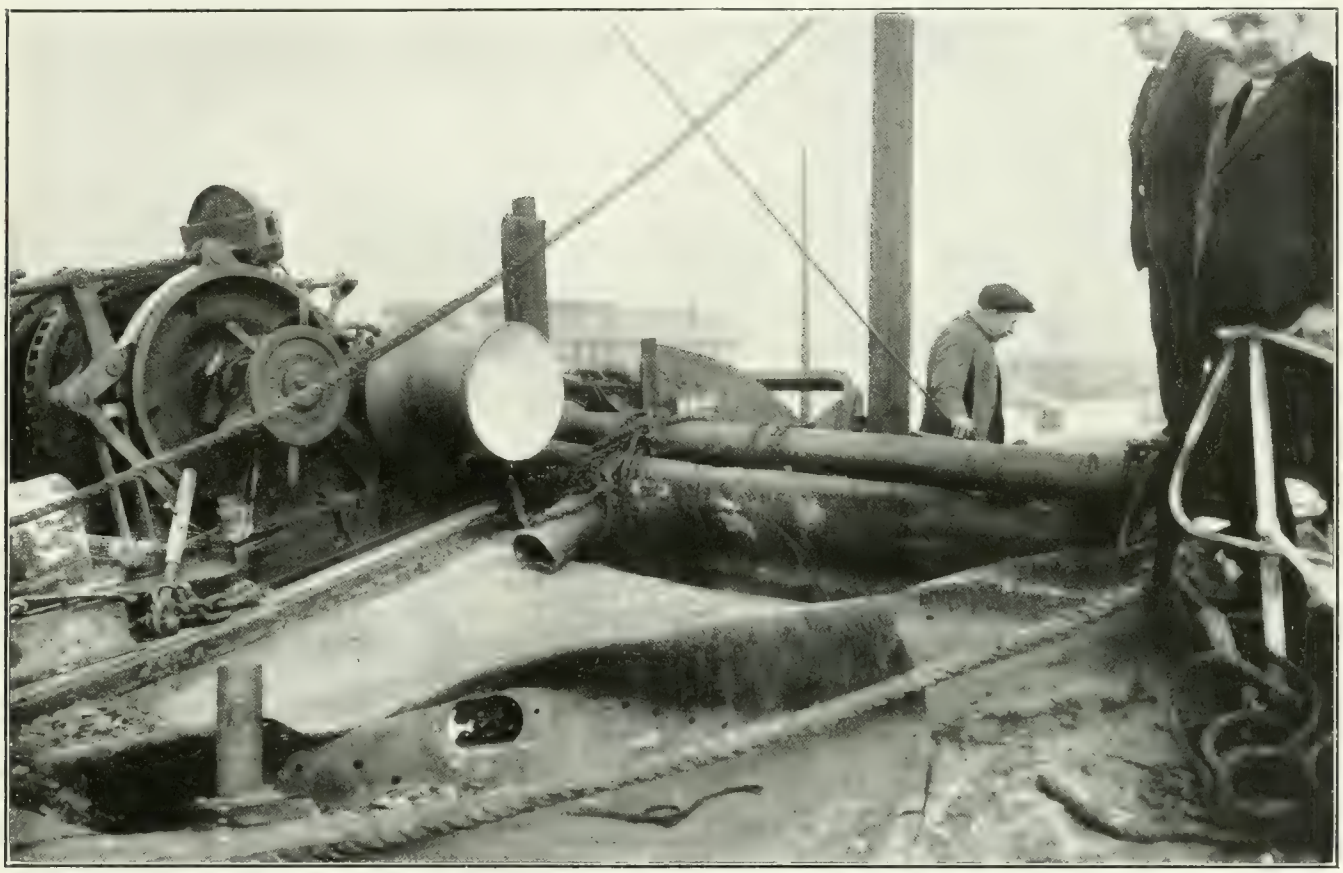
Minnie Steamship Company, Ltd.—Capital, 5,000 in £1 shares. Objects, to acquire the steamship formerly known as the *Spiral* of Christiania, and to carry on the business of shipbrokers, steamship agents, &c. First directors, H. W. Casper, A. Casper, W. Edgar, O. P. Arnold, T. F. Thompson and E. H. Casper. The last four named, trading as E. A. Casper, Edgar & Co., are the managers. Registered office, Royal Chambers, West Hartlepool. Private company.

PROTECTION AGAINST SUBMARINES.

One of the questions of greatest moment in naval circles at home and abroad is how a reasonable defence can be found against torpedo attack. The battleship seems to be as liable to be destroyed by the deadly submarine as the unprotected merchant ship. It is being brought home that the measure of protection which has hitherto been afforded is insufficient and new means must be found to give defence to the ships. Several methods have been adopted and others are under consideration. Torpedo netting and the elaborate internal subdivision have been principally employed up till the present time. It has been proven in actual warfare that the torpedo net defence can easily be penetrated by the modern torpedo and its usefulness is generally discredited. Watertight subdivision, even on an elaborate scale, does not seem to be sufficient either, as the explosion opens up too many compartments to the inrush of water. Two methods have been employed in recent ships, viz., plane armour bulkheads, and so-called "elastic" bulkheads, *i.e.*, bulkheads in which the plating is dished or curved and resists the pressures in virtue of tension. It has been customary in recent foreign battleships to fit an armoured side bulkhead in way of the vitals below the protective deck on each side and placed some 8 or 10 ft. inside the outer shell. Prof. Hovgaard points out that since the primary object of protective bulkheads is to resist very high gaseous pressures it appears rational to design them on the same principle as the shell of a cylindrical boiler which can be made to resist severe pressures without going to excessive thicknesses of plating. Elastic bulkheads of the curved or dished shape were first introduced in the French navy. Considerable saving in weight as compared with the internal armour bulkhead is achieved, but a combination of the features of the armoured and elastic bulkheads is considered best. Considerable reliance is placed by the United States naval authorities on the employment of compressed air for giving buoyancy to a damaged ship. This method might be all right provided the bulkheads can stand the strain imposed upon them. It has been confidently predicted that the battleship will yet be constructed which will be able to successfully withstand submarine attack and the United States authorities are hard at work devising means for the successful accomplishment of this in their new Dreadnaughts.

COLLISION DAMAGE TO THE STEAMER "CARDIFF HALL."

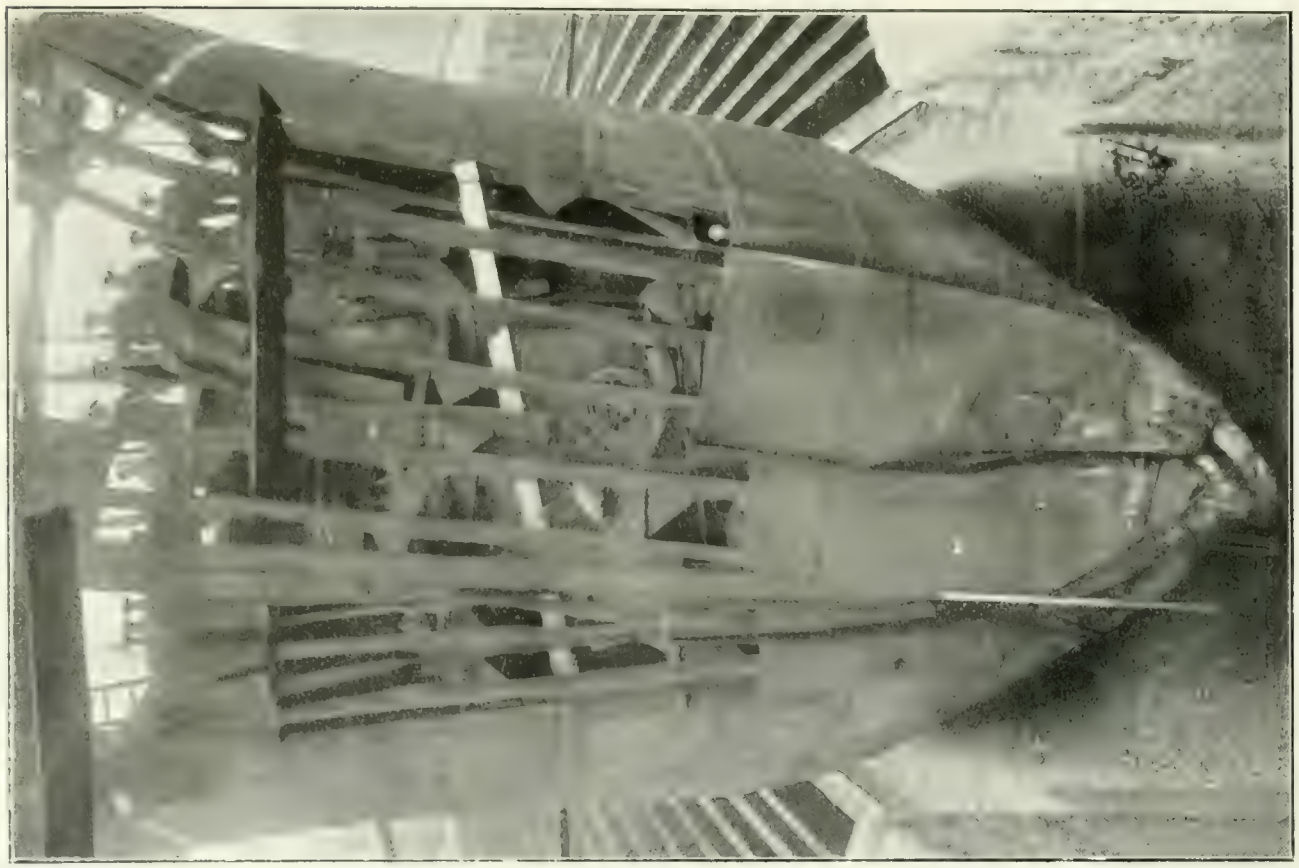
We reproduce herewith and on the following page some photographs showing the damage to the steamer *Cardiff Hall* sustained through having been in collision with another vessel. The *Cardiff Hall*, which is owned by the Standish Hall Steamship Company, Ltd. (Edward Nicholl & Co., Cardiff, managers) is a steel-screw steamer of 3,994 tons.



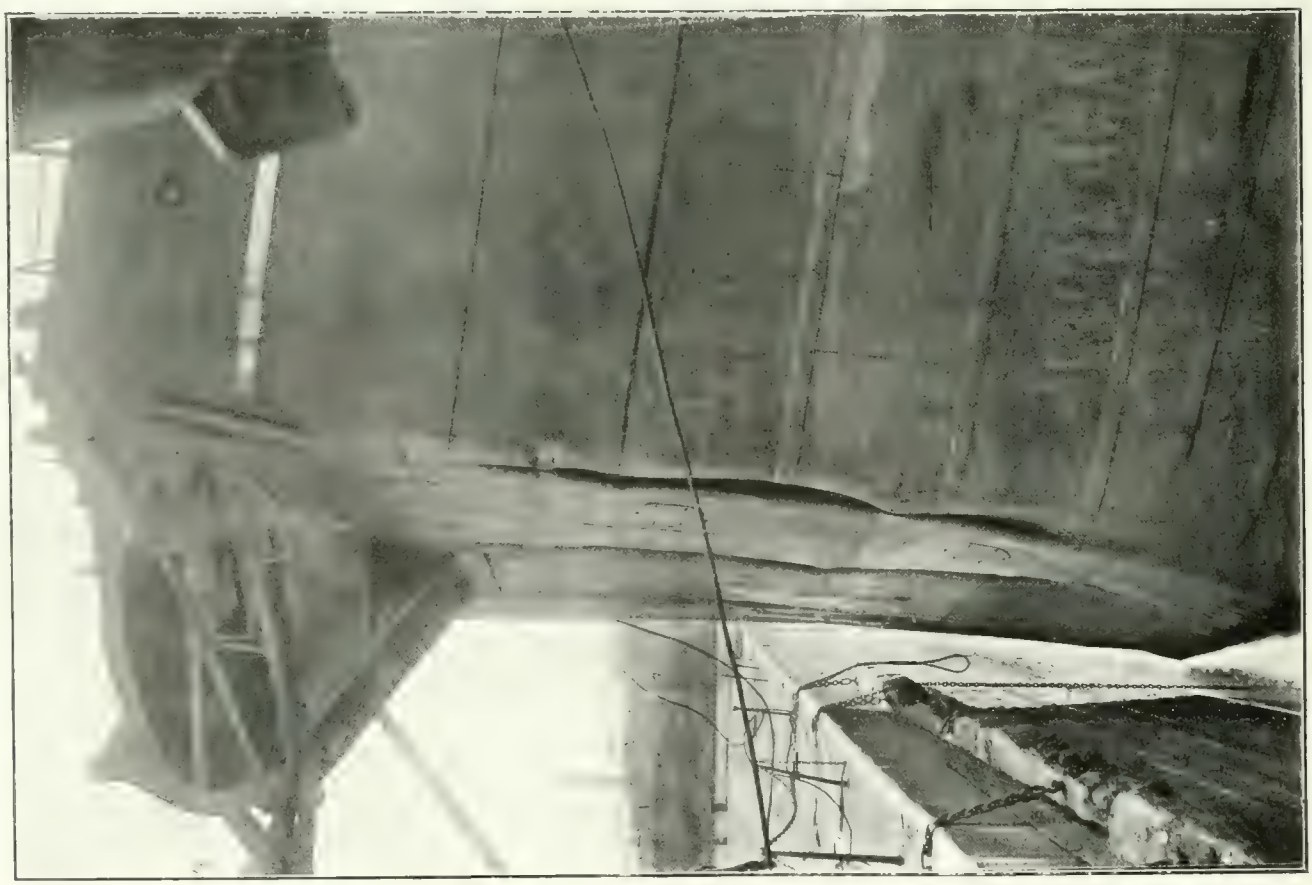
SS. "Cardiff Hall." View showing Buckled Forecastle Deck.

gross register with a deadweight capacity of about 6,650 tons. A glance at the photographs clearly illustrate the extensive damage done to the *Cardiff Hall*, and it is evident that the impact when the vessels met must have been tremendous, for the *Cardiff Hall's* bows were crushed back quite 18 ft., while the stem bar was twisted right round and forced into the plating on the starboard side. The bow and stem were forced back to such an extent as to make it appear as if the bow had been chopped off and re-plated with twisted and buckled plates. The forecastle deck was all twisted and buckled and even the windlass was raised, while the anchor hawse pipes were rendered useless. The vessel was taken into port and received temporary repairs, a bracket being erected for the purpose of lowering and raising the anchors. She afterwards proceeded to Cardiff where she was taken in hand by Thomas Diamond & Co. and placed in the Commercial Dry Dock for permanent repairs. The repairs are expected to take at least two months to complete.

COLLISION DAMAGE TO THE "CARDIFF HALL." REPAIRERS: THOMAS DIAMOND & CO., CARDIFF.



View showing Buckled Frames, Plating and Seams, after part of the Plating had been removed.



View taken from Port Side, showing Crushed Bow, temporary Repairs and temporary Anchor Bracket.

GENERAL NEWS SECTION.

PERSONAL.

Great regret is felt in shipbuilding and other circles on the Clyde at the death of Captain William McLeod McMillan, head of the firm of Archibald McMillan & Son, shipbuilders, Dumbarton, who was killed while directing his men in action near La Bassée towards the end of last month. Captain McMillan was the eldest son of the late Mr. Robert McMillan, shipbuilder, Dumbarton, and was born in 1876. He was educated at Fettes College, Edinburgh, where he was for two years captain of the Rugby Football XV. On leaving school he joined his father in business at Dumbarton, serving a term of apprenticeship in the shipyard, the drawing office, and the commercial department. He represented the fourth generation of shipbuilders in the family. On the death of his father, Captain McMillan became managing director of the Dockyard—one of the oldest shipbuilding establishments on the river—and since assuming the management of the business, he introduced many improvements, including an important extension of the yard in order to enable the firm to build larger vessels. It is understood that just before he left for the war he was negotiating for another important extension. Within recent years he also introduced to the yard two types of vessels not previously built there, namely, oil-tank steamers and vessels built on the Isherwood principle. Since the war broke out the firm commenced the building of vessels for the British Admiralty. Captain McMillan also took a prominent part in industrial and public affairs. He was Chairman of the Clyde Shipbuilders' Association in 1911-12, and he was also Chairman of the Dumbarton Harbour Board, and a member of Dumbarton School Board. Notwithstanding the great responsibility which rested on him as the head of his firm, his high sense of duty led him to offer his services to his country. As he had formerly been an enthusiastic and efficient officer in the Volunteer Force his services were of special value in training the new army. Last year he was granted a commission with the rank of Captain in the 11th Battalion of the Argyll and Sutherland Highlanders—a battalion which was raised by Colonel John M. Denny, and popularly known as the "Denny Highlanders." After spending some months with his battalion in this country, Captain McMillan crossed over to France and went to the front in the beginning of July last. He is survived by his wife, who is a daughter of Mr. James Denny, Dumbarton, and by two sons. Captain McMillan was married in 1904. Memorial services were held in Dumbarton churches for Captain McMillan on Sunday. In the parish church, the Rev. W. W. Reid said the thoughts of the community for many days had been occupied with sad, if proud, reflection, on the fate of one who had gained for himself the wholehearted regard and affection of the people of Dumbarton. Captain McMillan served his native place to the utmost of his ability all the years of his life in business, and he gave himself at the end, and in his death, in the service of the King and the Empire that he loved. He was every inch a man; strong, and holding to his purpose when his mind was made up; considerate, straight, and honourable in all his dealings. Behind the reserve that was never lacking in a good and true Scotsman, there was geniality and quiet humour. He never failed or disappointed his friends, and of enemies he had none. It was no more than the truth to say that he was the best-liked man in Dumbarton, and there was every promise that had he come back, he would soon have been the most influential citizen. The loss to public life in church and State, in business, and in the army, it was impossible to compute.

Photo] **The late Captain Wm. McMillan,** *[Elliott & Fry*
Chairman and Managing Director, Archibald McMillan & Son, Ltd., Dumbarton.

The death in action is reported of Captain E. T. Milton, of the 10th Northumberland Fusiliers. Captain Milton was the only son of Mr. E. J. Milton, Ship Surveyor, Lloyd's Register of Shipping, Newcastle. He was educated at Belfast, and received his marine engineering training with Workman, Clark & Co., Belfast, subsequently going to Swan, Hunter & Wigham Richardson's Neptune Works. He was serving as engineer in the Prince Line when war was declared, and immediately enlisted. He received his commission in September, 1914, and was gazetted captain in the following November. Captain Milton was in his 28th year.

The death occurred on October 5 at Tynemouth of Mr. Joseph Simpson Graham, Director and Manager of the Northumberland Shipbuilding Company, Ltd., Howdon-on-Tyne. Mr. Graham was born at Kinghorn, Fifeshire, in 1864, and was a son of one of the former partners in Osbourne, Graham & Co., of Sunderland. When 15 years old he started work as an apprentice to this firm at Hylton. From there he went to the new yard of Wood, Skinner & Co. at Bill-Quay-on-Tyne. He was subsequently appointed chief draughtsman with John Blumer & Co., of Sunderland, which position he held for nine years. He left to take up a position as manager of the pontoon yard of Swan & Hunter's, and while there he had charge of the construction of the Havana Dock, subsequently going to

Having to deliver it. In 1898 he was appointed manager of the Northumberland Shipbuilding Company, Ltd., becoming a director and general manager shortly afterwards. Mr. Graham had been actively associated with the various committees in connection with shipbuilding interests on the North East Coast. He was at one time Chairman of the Wages Committee, and during the last two years acted as Chairman of the joint committees for the revision of the riveters' price list now in operation. The deceased leaves a widow and three sons, the eldest of whom is Captain E. Graham of the 1st Tyneside Scottish. His second son, Mr. Charles Graham, is serving in France as gunner with the Royal Field Artillery.

Captain W. S. Main, of the "Hesperian."

Chief Officer Alex Maxwell, of the "Hesperian."

Commander W. S. Main, of the Allan liner *Hesperian*, whose gallant effort to save his ship after being torpedoed was publicly recognised at Liverpool last week, was born at Glasgow in 1852, and represents the sixth generation of a family of sea captains. He started his sea career in 1865 when only 13 years of age, and served in many sailing ships before joining the Allan Line in 1875 as third mate. In 1883 he was appointed master of the *Lucerne*, and in the intervening years has commanded 11 other of the Allan Company's steamers, the *Hesperian* falling to his charge in the year 1908. Captain Main was elected a Fellow of the Royal Geographical Society in the year 1895 for valuable research work, and for the discovery of an unknown bank off Newfoundland called the Corean Bank, after the vessel he commanded at the time. He is also a Fellow of the Royal Meteorological Society. He is a member of the Mercantile Marine Service Association, and also Commodore Captain of the Allan Line.

Chief Engineer A. Wilson, of the "Hesperian."

The late Mr. J. S. Graham,
Manager, Northumberland Shipbuilding Co.

Mr. Alexander Wilson, the Chief Engineer of the *Hesperian*, was born at Leven in 1876, and served his apprenticeship with the Durie Foundry Company, of Leven, Fifeshire, as engineer, and has now been with the Allan Line 20 years. After completing his apprenticeship his first ship was the *State of Nebraska*, and during the South African war he was on the engineering staff of the *Sicilian*, which was engaged in transport work. In 1908 he joined the *Hesperian* as second engineer, and his advancement to chief engineer has been made in the same ship.

The *Hesperian*'s chief officer, Mr. Alexander Maxwell, was apprenticed to Allan Bros. in 1887, and has thus a record of 28 years' service at sea. After finishing his apprenticeship he served for a few years in ships owned by Lamport & Holt and Crawford & Rowat, until in 1897 he obtained an appointment as fourth officer of the Allan steamer *Sarmatian*. He has thus advanced through all the various grades of an officer to chief, and his next step should bring him a well-deserved command.

THE LOST "HESPERIAN."

Mr. Runciman's Tribute to British Seamen.

The seamanlike conduct of the master, officers and crew of the Allan liner *Hesperian*, when she was torpedoed a month ago, in securing the safety of the passengers and in their plucky endeavour to save the ship, was fittingly recognised at Liverpool on Friday when the Right Hon. W. Runciman, M.P., President of the Board of Trade, handed to them awards made by the owners, the Liverpool & London War Risks Association, Ltd., and also a special gift to the captain from the British Government, which was made through the Board of Trade. The ceremony took place at the Liverpool Town Hall, and was presided over by the Lord Mayor (Councillor J. E. Rayner).

Sir Norman Hill, Manager and Secretary of the Liverpool & London War Risks Association, narrated the circumstances under which the *Hesperian* met her doom. He stated that at 8.30 in the evening of September 4, whilst 120 miles from the Irish coast, the *Hesperian* outward bound for Quebec and Montreal, and having on board a general cargo, 350 passengers and a crew of about 300, was struck by a torpedo forward. The explosion was exceedingly heavy, so much so that the vessel was brought to a dead stop. Due precautions had been taken on the voyage with regard to the boats and life-saving appliances. There was no panic, although several members of the crew and passengers had been killed by the explosion. The passengers and the majority of the crew were all safely in the boats and away from the ship within one hour of the torpedo striking her, and in response to wireless calls patrol boats came to the *Hesperian's* assistance. The owners of the *Hesperian* and the War Risks Association, which he (Sir Norman) represented, could not give special recognition to all of the liner's crew for the performance of their ordinary duties, however well those duties were performed. If they recognised conduct of that sort, they would be recognising it day after day. But what they wished to do in that case was to recognise the special efforts made by the master, officers and engineers and some members of the crew who tried to get the vessel safely into port. These men remained

on the ship for 34 hours struggling against the elements, with the aid of patrol vessels, to bring their ship into port, and they were only thwarted from accomplishing their object by a southerly gale, which caused the vessel to list and to labour heavily, and finally to sink. The names of the captain, officers and men who stood by the vessel in this way were :—W. S. Main, captain ; A. Maxwell, chief officer ; C. Richardson, 1st officer, A. M. Watt, 3rd officer ; A. Wilson, chief engineer ; A. Wright, 2nd engineer ; A. Galbraith, 4th engineer ; H. P. Ewart, 6th engineer ; H. Jones and R. Jones, Marconi operators ; R. Scott, boatswain ; J. Barry, boatswain's mate ; E. Mork, storekeeper ; J. Maxwell, quartermaster ; and E. Birch, carpenter. The Allan Line, added Sir Norman, had awarded the officers and men one month's full pay and a full month's holiday on pay, and they had replaced the kits lost by them. The War Risks Association had besides recorded their high appreciation of the courage shown in the endeavour to bring the vessel into port and had voted a sum of 50 guineas to the captain and one month's pay to each of the officers, engineers and members of the crew who stood by the *Hesperian*.

In the casualty, continued Sir Norman, 22 members of the crew lost their lives and 11 received personal injuries. Of the members of the crew who lost their lives, 10 left widows. The committee had already investigated seven of these cases, and had paid into Court in satisfaction of the claims under the Workmen's Compensation Act £2,088, being at the rate of £298 per case. They had also awarded in these seven cases, on the joint account of the State and of the Association, widows' pensions amounting in all to £280 per annum and children's allowances amounting to £111 per annum. The average amount of the pension awarded was £40 and of the children's allowances £16 per annum. The claims of the other widows and of the partial dependants were being investigated and would be dealt with promptly. The injured members of the crew had also been granted allowances under the scheme.

The Right Hon. W. Runciman, M.P., said it gave him the greatest pleasure, as President of the Board of Trade, to take part in the presentation, and although the duties which the officers, engineers and men of the *Hesperian* performed were being well recognised by the Association for which Sir Norman Hill is executive officer, it was only right and fitting that the Board of Trade, as being the Department directly associated with the mercantile marine, should give equal recognition to any special duties performed in this time of stress and peril. The captain, officers, engineers and crew of the *Hesperian* had performed their duties in no perfunctory manner, and they knew that every precaution was taken by them to face the perils they were likely to meet with on the voyage. These perils, he said, were characteristic of the military nation which organised them, and however much that nation might excuse itself for finding it necessary to interfere with British traffic, ships and men, as well as our own and neutral passengers, they could well say that no more dastardly form of warfare ever emerged from the mind of man. Their meeting that day was more particularly with the object of making a presentation as from Sir Norman Hill's association, but he, Mr. Runciman, felt that the awards which had been made by the Association—good as they were, were of a rather more fleeting character than other forms of presentation. Fifty guineas could be awarded and could be quickly spent. He had no intention whatever, as from the Board of Trade, in competing with the Liverpool Association, but he felt that when they assessed the merits of the services rendered by Captain Main, the best they could do was to give him something that would not be so fleeting as 50 guineas. Although the value in money of the gift from the Board of Trade was much smaller than that of the Association, it bore an inscription which he trusted the captain would regard as of more value than money. The Board of Trade wished to give him a permanent recognition of the services rendered by him, in the form of a silver bowl, bearing the following inscription :—" Presented by the British Government to William Smith Main, master of the ss. *Hesperian*, of Glasgow, in recognition of his exemplary conduct when his vessel was torpedoed on the 14th of September, 1915."

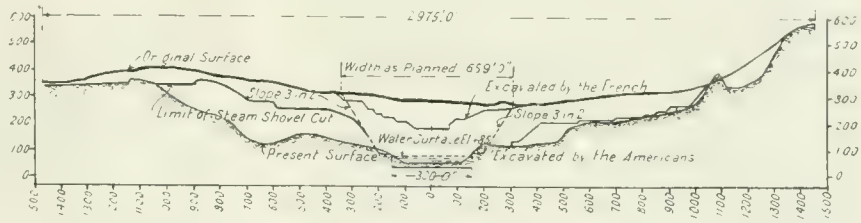
Captain Main briefly acknowledged the gifts, and on behalf of himself, his officers and crew thanked Mr. Runciman for his inspiring speech. He added that what they did in trying to save their ship, and passengers as well, was but carrying out the traditions of the British sailor.

THE PANAMA CANAL STOPPAGE.

The news from the Panama Canal zone becomes graver each day and it is now announced that the Canal is not likely to be opened for traffic before the end of this year or the beginning of next, Colonel Goethals, who was on the point of retiring from the position of Governor having, it was believed accomplished his task, has at his own request deferred his resignation.

Reference is made in the last copy of the *Canal Record* to hand of the earlier slides which took place in August and September. The report states that further movements of the slides on the east and west banks of the Canal at Culebra, which had caused a suspension of traffic through the Cut from August 7 to 10, prevented the passage of vessels from September 4 to 9, inclusive. On Friday, September 10, the channel was cleared sufficiently to allow the passage of the lighter draught vessels, of those which had collected at the two ends of the Cut and beyond while awaiting transit. Since that day the channel had been made wider and deeper and on Monday, September 13, the last of the larger waiting vessels, including the *Kroonland*, the United States collier *Proteus*, and the *Andijk* of the Holland-American Line, which was drawing 30 ft. of water were handled through the Cut.

This suspension of traffic says the account (it was evidently written before the last and most formidable slide occurred) was the most serious which has occurred since the Canal was blocked in October of last year by Cucaracha slide. In fact, this and the suspension in August have been the only occasions since October on which there was complete stoppage of navigation. At other times large vessels have been delayed for several days, but at the same time the vessels of medium draught were sent through without delay.



Cross Section of the Panama Canal where the Slides are taking place.

After the elimination of immediate danger at the base of Cucaracha slide the larger dredgers were stationed at the bases of the east and west Culebra slides, which, moving toward each other, had made considerable aggressions on the channel since the opening of the Canal to traffic. The dredgers were able to keep pace with the encroachment at the time, and even slightly to increase the channel in spite of it ; but under occasional accessions of momentum to the moving masses the material slid into the channel more rapidly than the dredgers could excavate it.

The section of channel affected by the two Culebra slides extends between Stations 1770 and 1798, a distance of 2,800 ft. The east slide lies directly to the north of Gold Hill, and the west slide to the north of Contractor's Hill. The width between the outer limits of the breaks on opposite sides of the Cut is greatest at Station 1787, where it amounts to 2,975 ft. A cross section of the Cut at this station is reproduced herewith. It is based on a survey made in August. The section was drawn with the elevations and horizontal distances on the same scale, so that the slopes are presented without distortion.

On the east side the break extends back 1,525 ft. from the centre line of the channel, and the surface at the outer limit of present breaking is 350 ft. above sea level. On the west side the break runs back 1,450 ft. from the centre line, and the present edge is at 585 ft. above sea level. The greater part of the movement at this time is from the west side. On July 1, it was estimated that 5,000,000 cubic yards were in motion on the west bank in this section, and 4,000,000 cubic yards on the east bank. Since that date about 2,000,000 cubic yards of spoil have been removed at the bases of the two slides.

In the past month and a half (*i.e.*, by about September 15) the forces of the Dredging Division made some remarkable records in excavation. Five hard material dredgers were employed at the bases of the Culebra slides and they and all the accessories serving them worked under heavy pressure 24 hours a day.

During August the excavation at the bases of the Culebra slides

amounted to 793,012 cubic yards. In the same month 66,228 cubic yards were removed from the base of the Culebra slide, and the seagoing suction dredger *Cascadas*, which operates between Gamboa and Paraiso to remove silt and keep the channel clean, took out 132,639 cubic yards. The total excavation in the Cut by seven dredgers was 991,879 cubic yards. From September 1 to the morning of September 13, the total excavation from the Culebra slides was 291,082 cubic yards and the total from the Cut was 380,127.

In the 24 hours ending at 6 a.m. September 5, the excavation from the bases of the Culebra slides amounted to 32,522 cubic yards. The quantities removed by the individual dredgers were as follows:—

Dredger	Type	Cubic yards.
	2-yard dipper	3,961
	2-yard dipper	4,241
	Ladder	5,190
	2-yard dipper	11,475
	15-yard dipper	7,655
Total		32,522

On the same day pipeline suction dredger *No. 86*, at Cucaracha slide, removed 4,684 cubic yards, and the *Culebra* took out 5,225 cubic yards. Thus the record for the day was a total of 42,427 cubic yards removed from the Cut.

In the 24 hours ending at 6 a.m. September 7, the dredger *Gamboa* excavated 12,545 cubic yards. This set a new record on the Isthmus for a dredger working in hard material.

The present dredging fleet, which has kept the channel open under all except the most severe movements, is to be augmented shortly by the addition of the new 15 yard dipper dredger *Cascadas*. Three 1,000 cubic yard steel barges, ordered as accessories to the *Cascadas* are now in service. The two 15-yard dipper dredgers now working in the Cut, the *Gamboa* and the *Paraiso* are doing, roughly speaking, slightly over half of the excavating at the Culebra slides. The addition of a third dredger of this type will mean increasing the dredging capacity of the slides by about 25 per cent.

It will be seen therefore from the preceding account how much more serious the latest stoppage is. Confidence had been sufficiently established since the opening of the Canal to allow of considerable use being made of the Canal and it had been open just sufficiently long to ensure a fairly smooth working of ships on the new routes. A large number were in consequence held up and although some have gone back and started on the journey via the Straits of Magellan not all have yet received definite orders. A cablegram has been received at the office of the American Consular Service, 45, New Broad Street, London, stating that ships now waiting to use the Panama Canal will be permitted to transfer their freight across the Isthmus by rail at a charge of $3 per ton, which includes all charges. Tolls which have not been paid into the Treasury at Washington will be returned, if the ships which have paid them turn back. Shipping interests are advised to make arrangements direct with the Governor of the Panama Canal Zone, whose cable address is "Pancanal, Panama."

Now that the closing of the Panama Canal has assumed such a serious aspect, underwriters are daily receiving notice of deviation of steamers bound through the Canal which have perforce, now, to take the Magellan route. The additional premium asked for each voyage, thus altered, is 5s. per cent., while in the case of steamers for "Time" the additional premium would be about £1 per cent. per annum, if their warranties are such as to prohibit the Straits of Magellan. Steamers done with the London Institute Time Clauses are at liberty to proceed by either route, but many fleets owned in America whose insurances are effected, in whole or in part, in the London market, a warranted trading via Panama and a special agreement will have to be come to with underwriters in their case.

New Fish Transport Steamer.—The *Börsen Halle* reports a new type of fish transport steamer to be under trial in Norway. The object is to carry the fish as far as possible without the use of ice. Thermally insulated holds fore and aft are kept at such temperature that fish is not frozen. Complete freezing is apt to affect the quality of the fish unless it be handled very carefully thereafter. The holds are insulated completely by cork-compo. plates; the double hatchways are similarly protected and the steel deck is covered with wood. The cost of the special hold construction (about £2,200) will, it is said, soon be recovered by saving in ice costs and better condition of the fish.

FROM OUR CORRESPONDENTS.

CLYDE AND DISTRICT.

(From Our Own Correspondent.)

Glasgow.

Although the Clyde yards are for most part occupied on Government work, good progress is also being made with the mercantile vessels in the course of construction in the district. Last week two vessels were launched and two others carried out successful trials and afterwards left to take up service on behalf of their respective owners. Of the two new vessels launched one is the *Montezuma*, a twin-screw Diesel-engined ship of about 5,500 tons gross, which the Ayrshire Dockyard Company (Harland & Wolff) have built at Irvine for Elder, Dempster & Co. The other is a twin-screw tug, built by Ferguson Bros., Port Glasgow, for the Union Government of South Africa. This vessel, which has been named *Sir David Hunter*, is similar in dimensions and construction to the *J. W. Sauer*, launched at the beginning of the present year for the same owners. Trials were run on the Firth during the week by the Harrison liner *Governor*, built by D. & W. Henderson, Meadowside, and by the steamer *Ilston*, built by Dunlop, Bremner & Co., for Swansea owners. This week, Barclay, Curle & Co. have docked the British India steamer *Mandala* for hull cleaning and painting prior to running trials.

New Harbour Regulations.

With a view to facilitating the loading and discharge of vessels at the harbour a committee of the Clyde Trust have had under consideration the duties performed by the harbour-master and the traffic superintendent of the port. It appears that hitherto there has been a certain amount of overlapping between the two departments, and in adjusting the duties of the respective officials the committee have drawn up a set of general instructions to be observed by each. In the first place, daily lists are to be exchanged between the harbour-master and the traffic superintendent showing generally what berths are occupied and free, and how the sheds or quays are occupied with goods, and when they should be free. The duties of both officials are also defined with regard to the laying down of goods either for shipment or for removal to warehouse. The regulations were approved of at the monthly meeting of the Trust held last week.

Navigation in Scottish Waters.

The attention of shipowners and shipmasters is directed to the fact that Stornoway Harbour is closed from one hour after sunset to one hour before sunrise. All vessels, with the exception of local boats, arriving during the night should anchor outside until the morning. Regulations have also been issued with a view to safeguarding the inter sts of shipping in the Pentland Firth and the Moray Firth. It is announced that the area between the western entrance to the Pentland Firth and the eastern approaches to the Pentland and Moray Firths has been divided into three areas, marked "A," "B," and "C." which are indicated on a chart. No vessel, either British, Allied or neutral, is to be under way in the areas "A" and "B" from half an hour after sunset to half an hour before sunrise, and no west-bound vessel is to be under way in the area "C" during the same period. The passag through the Pentland Firth presents g ave risks to west-bound vessels and they are advised not to take it.

THE NORTH-EAST COAST.

(From Our Own Correspondent.)

Newcastle-on-Tyne.

There is a feeling that the needs of the Admiralty are now practically met so far as new tonnage is concerned, and that in the course of the next few months some relaxation will be afforded certain of the yards to undertake a large proportion of commercial tonnage. Certain it is that numerous inquiries for various special types of steamers, both for home and foreign owners, are freely in circulation. An interesting feature is the prevalent boom throughout all countries in sailing ships, and several orders for ships for coastal work are believed to have recently been given out. The German prize schooner, *Theodore*, 189 ft. by 31 ft. 6 in. by 15 ft., built at Kastel-on-Rhine in 1911, is due this week alongside the yard of Wm. Hill & Co., Ltd., South Shields, for the installation of 80 b.h.p. Bolinder's crude oil motor machinery. This will be the first coasting sailing ship to be fitted with motor machinery

in this district. The work is expected to be completed within three weeks and is being undertaken on behalf of the new owners, Arthur Tate & Co., of Newcastle-on-Tyne.

Ship Repairing.

There has been an improvement in the volume of work on hand and due for arrival. The majority of the graving docks and pontoons have been fairly consistently occupied during the past week, and some of the work is of more than ordinary interest. At Wallsend, Swan, Hunter & Wigham Richardson, Ltd., are completing the conversion of the Liverpool-owned steamer *Delmira* into a molasses carrier, and she is expected to leave the river shortly. Clelland's Graving Dock & Slipway Company, Ltd., of Willington Quay, have in hand the ss. *Dalton*, owned by W. Swanston & Sons, of Newcastle, and the ss. *Swiftsure*, owned by Witherington & Everett, of Newcastle. John Readhead & Sons, Ltd., have the ss. *Lotusmere*, owned by Geo. Jaques & Co., the managing owners for the Alnmere Steamship Company, Ltd., and the ss. *Wm. Balls*, owned by W. D. C. Balls & Son, of North Shields, in dock for extensive bottom damage repairs, whilst recent arrivals alongside are the ss. *Northville*, ss. *Venetra* and the Moor liner *Jerseymoor*. At Jarrow, the Mercantile Dry Dock Company, Ltd., have in dock the ss. *Weehawken*, owned by John I. Jacobs & Co., of the Restitution Steamship Company, Ltd., and alongside is the ss. *Alphonse Conseil*, belonging to Mr. J. Stern, of Paris. The Middle Docks & Engineering Company, Ltd., South Shields, have in their docks the Scandinavian steamer *Erica* and the Wear-owned ss. *Magnus Mail*, and alongside is the ss. *Elvet*, of the Sharp Steamship Company's fleet. Brigham & Cowan, Ltd., South Shields, have in dock the ss. *Standish Hall*, belonging to E. Nicholl & Co., Cardiff, and alongside are the ss. *Fernmoor* and *Monmouthshire*. This firm has also in hand alterations to the sailing vessel *Fullwood*, which has been used exclusively for carrying whale oil, but is now being adapted for the carriage of coal and other stores on the outward journeys. At their Bull Ring Docks, North Shields, Smith's Dock Company, Ltd., have in dock the ss. *Samui*, previously owned by the East Asiatic Company, of Copenhagen, but which has recently been sold to Bergen owners. This vessel grounded at the Skerries some months ago, and after having been totally submerged for a few weeks was salved by the Ardrossan Salvage Company and brought to the Tyne with nearly 1,000 tons of general cargo on board. The repairs are of a very extensive nature and will take about six weeks in completion

MERSEY SHIPPING AND SHIPBUILDING.

(From Our Own Correspondent.)

Liverpool.

Inquiries made amongst the shipbuilding and ship-repairing yards in this district reveal that amongst a certain section of the engineering and skilled workers there is, what is termed locally, a good deal of "skulking" and "ca' cannying" at their work, and though they are obeying up to a certain degree the regulations of "controlled" establishments, such as offering themselves for work more regularly and putting in overtime when required to do so, their heart is not in their work, owing to some grievance in regard to pay which, in their view, has not been satisfactorily adjusted by the Government Committee on Production.

To understand the position as it exists to-day, it is necessary to state that of the engineering workers in the Mersey district, about 80 per cent. are employed by the members of the Ship Repairers' Federation, and the remaining 20 per cent. by Cammell, Laird & Co., Ltd. In January this year the Mersey Ship Repairers' Federation gave all their engineering employees a 3s. a week advance in respect of repair work. Shortly afterwards the engineers employed by Cammell, Laird & Co. made application for a similar advance, which, after some negotiations, the firm conceded. Some few months later the whole of the shipbuilding and engineering workers employed by the Mersey Ship Repairers' Federation asked for a further advance in wages of 25 per cent., and on this application being referred to the Committee on Production they were given an advance of 4s. a week. The engineers employed by Cammell, Laird & Co. were not included in this decision, and they immediately applied to be put on equal terms, but on their application being considered by the Committee on Production, they only succeeded in getting a 1s. per week advance, instead of 4s. It is from this anomaly of having two rates of pay in one district, instead of a flat rate, that the unrest has arisen, and it is important to note here that in the year 1912 the Board of Trade acknowledged that there should be a flat rate for the engineering workers in the Mersey District, and the Committee on Production have, by their decision in respect of Cammell, Laird & Co.'s workers, upset it.

It is common knowledge now that the Birkenhead engineers were determined upon a strike, and although they were disuaded from going so far, the cases heard before the Local Munitions Tribunal have disclosed that, as an alternative to a strike, they, with the connivance of their trades union leaders, refused to work overtime. Thwarted in this manner of protesting against their alleged inequitable treatment by the punishment inflicted, they have, for the time being, resorted to the "ca' canny" methods, and obviously restricting their output of work accordingly.

I learn, however, that a very earnest effort is about to be made to get the Committee on Production to reconsider their case, and if this is not entertained they will put before their employers an entirely new application, which will ensure their claims being again laid before the Committee on Production in full. In this connection, however, it needs to be stated that apart from this dissatisfied section of engineers, the workers generally engaged on munitions in the shipyards here, which are now all controlled establishments, are "pulling out," and giving their employers no cause for complaint to speak of.

It does not follow, however, that the present level of wages will be adhered to. The ship plumbers, who in May last were given with other engineer workers the 4s. advance and whose three years' agreement with their employers expires at the end of December next, have given the required notice that a new agreement must concede them a further advance of 7s. 4d. per week, and this, of course, will have to be referred to the Committee on Production.

One comment on this is only necessary. If the plumbers' application is granted, either in full or in part, it will give other engineering workers their cue to make new demands, and so keep the wages question in a continuous state of agitation.

New Swedish Line.

A new regular line of Swedish steamers will be inaugurated on November 4 between Manchester and Liverpool and the following Baltic ports:—Gothenburg, Helsingborg, Malmo, Copenhagen, Halmstad, Stockholm and other ports in that region. The agents of this new service on this side are T. B. Stott & Co., and the ss. *Milos* is the first outward steamer from the Mersey on November 4.

SOUTH WALES NOTES.

(From Our Own Correspondent.)

Cardiff.

The Swansea Water and Sewers Committee have decided to increase the charges for water for shipping, being of the opinion that the shipping industry could well stand the extra charges during the duration of the war. At present the charge is 1s. per 100 gall. for domestic purposes, and 6d. for water for boilers. It has now been decided to make an all-round charge of 1s. per 100 gall. from November 1 next. At Cardiff the charges are 1s. per 100 gall. for domestic and steam purposes, up to 500 gall., and then 6d. extra for water required for the boilers. The Newport charges are the same as at Swansea, where the new tariff will mean about £1,000 a year towards the rates.

Altogether the export and import trade of Swansea during the past month totalled 530,590 tons, or 156,604 tons more than in September of 1914, but 101,790 tons less than in the same month of 1913. Imports alone last month aggregated 55,161 tons compared with 79,313 tons in September, 1914, while exports at 475,429 tons, against 294,673 tons, recorded an improvement of 180,756 tons. Coal and coke shipments amounted to 356,143 tons compared with 144,355 tons in September, 1914; while patent fuel exports reached 74,859 tons against 51,448 tons. For the first nine months of this year exports and imports totalled 4,545,463 tons, compared with 4,705,677 and 5,413,894 tons in the same period of 1914 and 1913 respectively. The financial accounts for August last show revenue of £22,942 and expenditure £27,673, a deficit of £4,731 compared with a loss of £8,274 in August, 1914. Surplus revenue account at the end of August last was reduced to £7,421, and the treasurer's balance on accruing interest account stood at £27,954.

Ship Repairing.

A threatened stoppage of the crane and locomotive drivers at the Cardiff and Barry dry docks has been averted. It appears that the fitters, for six months of the year, start work at 6 a.m. and for

the other half year at 7 a.m. The drivers, however, commence at 6 a.m. all the year round and receive no extra pay. To this they have taken exception and demanded an advance in their wages or at 7 o'clock start with no reduction in wages. Several meetings with the employers have been held, and the matter has been settled by the masters granting them an extra hour's wages per day, which is equivalent to an advance of about 4s. per week. Thus a difficulty which may have thrown the yards idle, as the support of other dry-dock workers had, I understand, been promised the drivers, has fortunately been successfully overcome by mutual arrangement. Generally there is little that is fresh to report with regard to new work. Most docks are fairly well employed, and there are several heavy jobs in hand. The Cardiff Channel Dry Docks & Pontoon Company, besides fitting a number of bottom and side plates on the steamer *Neebing* are also renewing the sternpost, while the Penarth Pontoon, Slipway & Engineering Company are fitting a new sternpost and several bottom plates on the steamer *Muskwa*. The steamer *Mona Brea* has had a new sternpost fitted by the Barry Shipbuilding & Engineering Company, Ltd., while Elliot & Jeffrey, Ltd., are still busy surveying the steamers *Castro* and *Grigorios Anghelatos*, and completing boiler work on the tug *Bantam Cock*. The Cardiff Junction Dry Dock & Engineering Company continue engaged with fire damage to the steamer *Hornpath*, and Thomas Dinmond & Co. have a big stem job on the steamer *Cardiff Hall* illustrated on pages 325-26), which had her bows crushed back about 18 ft. as the result of a collision. The work on the *Cardiff Hall*, which includes a new stem bar and a large number of plates, stringers, frames and floors, is expected to occupy about two months. The Barry Graving Dock & Engineering Company are fitting about a dozen shell plates on the steamer *Gardenia* and are still working on the steamer *La Fontaine*, which has been in dock since July 27 for heavy bottom, internal and deck repairs. The Mountstuart Dry Docks, Ltd., are actively employed with heavy survey repairs on the steamers *Acme* and *A. D. Kydoniefs*, overhauling work on the steamer *Lake Michigan*, and heavy internal damage repairs to the steamer *Twilight*. John Shearman & Co., Ltd., are dealing with 18 vessels at Cardiff, Barry and Newport, included amongst which is heavy repairs to the steamers *Helgoland*, *Roskear*, *Elsinore Grange* and *Bellington Grange*.

BELFAST SHIPBUILDING AND SHIPPING.

(From Our Own Correspondent.)

Belfast.

The yards and shops in Belfast are still working at high pressure, overtime and night shifts going constantly in various departments. New work is regularly coming in absorbing immediate attention, and very little is consequently being done on merchant work which continues to occupy a back seat. There is little likelihood of the output for the year as far as merchant work is concerned exceeding 50,000 tons, which is phenomenally small for Belfast. To date the tonnage for the year is only about 30,000 tons consisting entirely of five fruit-carrying boats for the West Indian traffic.

The Shipping Trade.

Although the tonnage of vessels arrived in the port from January 1 to October 1 shows a drop from 2,530,835 tons to 2,319,162 tons, compared with the corresponding period of 1914 trade has been very steady for some weeks, foreign and home arrivals being numerous. The daily service to Fleetwood which was interrupted by a strike is again in full swing. Complaints have been rife for a long time regarding delays in delivery of goods by the shipping companies, and the local Chamber of Trade has taken the matter up. This chamber represents a large section of the retail distributive trade of the city and district and has drawn up a resolution which has been forwarded to the companies and the Board of Trade. The resolution calls on the Government to take action to ensure more prompt delivery, and adds "while we are quite prepared to be put to some inconvenience through the boats being occasionally withdrawn for war purposes, we feel that the companies are making this an excuse to cover other reasons for non-delivery.

Cranage Charges.

The Harbour Commissioners have drawn up a new schedule of rates for the use of the cranes and masting sheers of the estate. It was found that owing to increased cost of coal, &c., some of the cranes were being run at a loss. The advance amounts to 10 per cent. all round and the new scale comes into force on November 1. It applies to all the cranes except the new 100-ton crane at the Alexandra Wharf.

THE FREIGHT MARKETS.

(From Our Own Correspondents.)

London.

A general quietness of tone, with more easiness in homeward rates from America, characterises the freight market position. The Gulf and the St. Lawrence are dull, and so, too, is the Plate. Homeward from the Mediterranean there has been rather more activity and timber from the Gulf may be described as firm. In the Plate section 65s. is quoted from up-river, and 62s. 6d. from down-river ports to the United Kingdom, with options. From the nitrate ports, 80s. is obtainable to France for later loading. Bombay reports a shortage of suitable vessels, and from Saigon 76s. has been conceded for rice to the *Tsushima Maru*, to Marseilles. Karachi has paid 45s. to a 5,900-ton boat to Port Said and Dieppe. In the American coal section 50s. is offered to West Italy. For grain from the Northern Range the rate is about 13s. 6d. to the Piræus. The *Kenilworth*, 20,000 quarters, 10 per cent., has been closed at 12s. to the west coast of the United Kingdom, 12s. 6d. if east coast. Alexandria has taken up the 4,000-ton steamer *Tiger* at 29s. per 60 cubic ft. to Hull. For a transatlantic round, time charter, 20s. has been paid to a 5,500-ton steamer. Firmness has prevailed in regard to North African phosphate cargoes. Sfax would pay 27 fr. to French ports. Cotton is slow in arriving and rates for this business are nominal. The *Mandalay*, 140 cubic ft., has been closed by Savannah charterers to Liverpool, and to one port in the Bristol Channel, at 152s. 6d. From New York to Australia 95s. is offered. Business could be done from Savannah to Vladivostock for cotton at $1 30c. per 100 lb. Outward coal freights from the Tyne maintain their high level with Genoa at 43s. 6d., and Malta at 39s. Las Palmas has been done at 35s., and in the Bay section rates are based on Bordeaux 26s. Dunston to London has paid 9s. 4½d., although C.T. vessels have been fixed at about 8s. Other recent fixtures are: Rouen, 18s.; Cherbourg, 24s.; and Boulogne, 17s. 3d. Cardiff reports that although the freight market is rather quiet the tone is firm. Representative fixtures are:—Marseilles, 45 fr.; Genoa-Savona, 39s.; and Caen, 14s. 7½d. Newport to Villareal has paid 25s., whilst Port Talbot to Genoa has been done at 40s. A steamer has been closed from Liverpool to Alexandria at 37s. 6d., whilst Hull to Calais or Treport has been done at 16s. 9d. For a small steamer 9s. 9d. has been paid, prompt loading, Goole to London.

Glasgow.

Chartering has been pretty active at Glasgow during the week, especially in the coal trade to French and West Italian ports, and more tonnage could easily have been fixed had it been available. The outward rates from Wales were strong and business was done at 42s. 6d. to the River Plate; 50s., Aden; 42s. 6d., Port Said; 45 fr., Marseilles; 42 fr., Algier; and 39s., Italy. The following fixtures from Scottish ports were announced:—Glasgow to Bordeaux, 3,000 tons, 31·50 fr.; Glasgow to Bordeaux, 3,600 tons, 32 fr.; Glasgow to Genoa, 4,400 tons, 40s.; Glasgow to Genoa, Savona or Leghorn, 3,800 tons, 40s.; Glasgow to Bordeaux, 31 fr.; Troon to Genoa and Methil to Genoa, 40s. each. Other fixtures, homewards, were Hornillo Bay to Glasgow, 16s. 3d.; Bilbao to Glasgow, 1,300 tons, 15s.; Bilbao to Middlesbrough, 1,500 tons, 17s. There was a good demand from America for the homeward trade and tonnage was more plentiful. Some business was done in grain to West Italy at 14s.; Bristol Channel at 12s.; and Rotterdam at 12s. 6d. from the northern ports. Cotton freights were quiet, at 155s. to 160s. from Savannah or Charleston to Liverpool. Homewards from the River Plate varied from 68s. 9d. to 70s. during the week, the tendency latterly being towards the lower figure.

Newcastle-on-Tyne.

The outstanding feature in the local freight market during the week under review has been the continued firmness of rates from Bay and Mediterranean destinations. Tonnage is in much better supply and, in consequence of a heavy demand for steamers owing to the improved degree of activity on the coal markets, a brisk business has been transacted. Coastwise rates have shown easiness at times but are generally well maintained at about 9s. 3d. to London. Chartering for ports of North France has been brisk but rates for Rouen are from 6d. to 1s. down on the week. Dunkirk is from 3d. to 1s. lower and Calais from 1s. 3d. to 2s. reduced. The Bay is a very steady market and Bordeaux is from 1s. to 1s. 6d. advanced since last week. A strong request for Mediterranean tonnage has had the effect of forcing rates upward and Genoa is from 1s. to 4s. higher, whilst Oran at 35s. records an

advance of 5s. on late prices. Rates for Spain and the Islands are correspondingly higher. Fixtures arranged since last report include following:—Boulogne, 800, 17s.; Bordeaux, 3,000, 26s.; 2,600, 25s. 6d.; Calais, 800, 17s.; 1,250, 17s. 9d.; Chantenay, 1,300, 24s. 9d.; 1,700, 24s. 10½d.; Caen, 700, 24s., coke; Civita Vecchia, 3,000, 42s.; Cherbourg, 600, 24s. 6d., coke; Dunkirk, 1,250, 17s. 6d.; Genoa, 1,950, 41s.; 6,500, 43s. 6d., from Dunston; 5,900, 43s.; 4,800, 44s.; 5,000, 43s. 6d.; Havre, 700, 24s., coke; Leghorn, 4,000, 43s. 6d.

Liverpool.

Business continues restricted on this market owing to the high level of freights and to the limited amount of free tonnage. In outward directions the Mediterranean and the River Plate maintain their firmness, the latter being now worth 41s. 3d. from the West Coast coal ports. Partington (Ship Canal) has again fixed coals to Rouen at 16s. and Liverpool has got 45s. to the Piræus and Salonica. Time charter rates keep very firm, and suitable tonnage scarce. A States round has made 20s. and two Transatlantic rounds paid 19s., while the *Semantha* has been fixed for six months in the Mediterranean trade at 17s. 6d. Homeward business is tending to slacken in the North American trade. Grain is not now so active and rates have eased to 12s. from the Northern Range to United Kingdom, and 13s. 6d. to West Italy. Baltimore or Newport News to West Italy was, however, done at 14s. for November. River Plate is again quiet, and only 65s. indicating San Lorenzo to United Kingdom. Eastern markets show little movement, and India is unchanged. Bombay alone fixing tonnage with ore at 50s. to United Kingdom, and to Baltimore at the same rate. Mediterranean is quietly steady with a tendency for rates to stiffen owing to recent war developments in that quarter. Ore rates particularly have appreciated, and notably so from the Spanish ports, Huelva to Garston now offering at 14s. 6d. to 15s. Hornillo Bay to Glasgow has been done at 16s. 6d. Bilbao rates have also risen and quote 15s. to West Coast ports. North Pacific is a firm market at 100s. to the United Kingdom, with higher rates probable owing to Panama trouble. Nitrate ports are likewise firm at 80s. to 82s. 6d. home and to French Atlantic ports. Sail tonnage is in quiet demand outwards, a fixture Garston to Santos making 30s. Some fixtures are reported homewards, but the market generally is dull.

Cardiff.

The Balkan crisis has had no further influence on the freight market, Greek tonnage having already been withdrawn. Fresh high records were established at Cardiff and Swansea during the past week, the scarcity of tonnage continuing. For the Mediterranean a fair demand was in evidence and rates maintained a firm tone, Algiers paying 42 fr. (twice—a new high record); Gibraltar, 25s.; free discharge, 28s. (three—a new high record); Genoa, with options, 39s. (ten); Lisbon, 24s. 6d. (350 tons delivery—a new high record) and 23s. (500 tons delivery); Marseilles, 47½ (twice) and 45 fr.; Malta, 37s. 6d.; Oporto, 23s.; Port Said, 42s. 6d. (twice); Seville, 27s.; Tarragona, 32s. 6d.; and Torre Annunziata or Civita Vecchia, 39s. 9d. (500 tons delivery); and Villa Real, 25s. The Bay and coasting markets, owing to a lack of inquiry, however showed an easier tendency, though rates so far have not materially decreased. Bordeaux was done at 30 (seven) and 28 fr. (three); Bayonne, 30 fr.; Caen, 15s. 3d., 14s. 6d., 14s. 7½d. and 14s. 9d.; Havre, 15s.; London, 9s.; La Pallice, 28 fr. (a new high record); Nantes, 29 (a new high record), 28½, 28 and 25 fr.; Rouen, 17s. 6d., 17s. (four), 16s. 6d. (twice) and 16s.; St. Nazaire, 28½, 28 and 24 fr. South American business was quiet, with rates steady, at Campana or Villa Constitucion, 45s., option; Rosario, 45s. 6d. (a new high record); Buenos Ayres, 40s.; and River Plate, 41s. 3d.; while Islands chartering was represented by Las Palmas or Teneriffe at 30s. and Cape de Verdes or Dakar at 35s. Eastern chartering was confined to Aden at 49s. 6d. (a new high record). Tonnage aggregating 220,650 tons was fixed from Cardiff or Newport, or 101,900 tons more than in the previous week.

Hull.

The market is somewhat irregular as a result of the change produced in the supply of tonnage by the recall to the Mediterranean market of Greek tonnage. In the Mediterranean market after rates had advanced up to 42s. 6d. for Genoa from Hull and 42s. 6d. for Alexandria from Hull they eased slightly down to 40s. In the River Plate direction rates are based on 42s. 6d. for Buenos Ayres from Hull. In the coasting branch 17s. to 18s. rules for Rouen from Hull, 16s. 6d. for Dieppe from Hull, 16s. 6d. for Treport from Hull, 16s. 6d. for Honfleur from Hull, whilst Hull to Calais option Treport was fixed at 16s. 9d. and London from Goole was done at 9s. 9d. for a small carrier.

COMPANY MEETINGS.

London-American Maritime Trading Company, Ltd.

The first annual general meeting of the shareholders of the London-American Maritime Trading Company, Ltd., was held on October 7, at the Great Eastern Hotel, London, E.C., the Earl of Wemyss, Chairman, presiding.

The assistant secretary (Mr. H. A. Perks) read the notice convening the meeting and the auditors' report.

The Chairman, in moving the adoption of the report said that the first year's trading of the company had practically synchronised with the most terrible year in the world's history. It had naturally been a time of great anxiety to the directors. Two of their ships during the past year had fallen victims to the enemy. The *Rio Iguassu* was legitimately sunk by the German cruiser *Karlsruhe*, and the *Rio Parana* was afterwards sunk by a torpedo in the Channel. In both cases there was no loss of life. Of course, the loss was covered by insurance, but much valuable earning time was wasted during the period these two ships were being replaced. The company, as regarded six of its nine vessels, was under a time charter with the Rio de Janeiro Light & Power Company. Under this charter they were sure, no matter how low freights might be, of having continual and remunerative employment, but at the same time the system had its disadvantages. They could not have it both ways; and while freights were high they could not reap the full advantage of those high freights. Apart from this they had had considerable bad luck, because two of their unchartered ships met with accident. One of them was laid up for five months and the other for four months at a time when they might have been reaping a golden harvest. The trading results showed a profit of £130,588. The directors propose to deal with this sum in the following way:—£4,123 went for various expenses, and £21,697 went towards paying the interest on and the redemption of debentures. Many companies of this nature were handicapped and their earning possibilities choked by the weight of debentures round their necks. They had raised £200,000 of 5½ per cent. debentures, towards the liquidation of which they agreed in the prospectus to pay £29,000 annually. As these bonds were drawn or purchased, the interest payable, of course, diminished, and the money for redemption increased, and at this rate, in 8½ years the preference and ordinary shareholders would enter into the unencumbered enjoyment of their property, and the debentures would be entirely paid off. That, he thought, was a very satisfactory point, and obviated as long as it prevailed the necessity of putting aside any large sum for depreciation at the moment. They proposed to have a reserve for contingencies of £25,000. Underwriting and other formation expenses were written off by £5,500, and £20,000 put to a general reserve, making reserves of £45,000 altogether, leaving a balance of £54,267. The directors proposed to deal with that amount in this way—the payment of the fixed dividend of 7 per cent. on the cumulative shares would absorb £6,721, leaving £47,546 available for further distribution. They further proposed to carry forward £2,546, leaving a balance of £45,000—the same amount as to reserves—which they proposed to divide in the following way:—A supplementary dividend at the rate of 4½ per cent.—under the prospectus the preference shares were entitled to a first call of 10 per cent. on the divisible profits of the company—which would absorb £4,500, and a dividend of 27 per cent. on the ordinary shares, which would amount to £40,500. As regarded the contingencies fund he would say that "contingencies" might mean possibilities which were so probable that they amounted to certainties. On the other hand, they might indicate possibilities which were so unlikely that they could be neglected. He was glad to say that he thought they could safely put their contingencies in the latter category. They had subscribed £40,000 to the War Loan. In the balance-sheet £6,000 was put down as paid, but since it was made up they had paid the whole of the balance. On the other side of the balance-sheet was a loan against security of £19,000; and the whole of that had been paid off. As regarded bills payable in respect of the purchase of and secured on steamers not included in the debenture trust, £37,250, the whole of that amount had been paid off, and the two steamers which were security for this loan had been included in the debenture trust. As regarded their tonnage, whereas at the time of the prospectus their steamers aggregated 62,676 tons d.w., on July 31 with the same number of steamers, the deadweight tonnage was increased to 71,510, and although the price of ships had increased enormously, yet at the date of the balance-sheet, comparing the cost of their fleet with the original cost in 1914, it practically came out at the same price per

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COMPANY REPORTS.

New Zealand Shipping Company, Ltd.—The report for the year ended June 30 states that the directors recommended a dividend of 10s per share (less income-tax), of which 8s per share was paid on April 7, carrying forward £33,563. Delivery of the steamers building for the company and the Federal Steam Navigation Company, Ltd., referred to in last year's report, is still delayed.

Osaka Shosen Kabushiki Kaisha.—The profit and loss account for the half-year ended June 30 last shows receipts by freight and passage money, 9,439,082 yen; subsidies, 892,823 yen; miscellaneous receipts, 775,768 yen; making a total of 11,107,593 yen. Of this, general expenses account for 7,668,726 yen; insurance, repairs and depreciation, 1,798,000 yen; leaving a profit of 1,640,867 yen. From this 82,500 yen has been placed to the reserve fund, and directors' and auditors' fees absorb a similar amount, leaving a balance of 1,475,867 yen, which, with 864,533 yen brought forward from the last account, makes a total of 2,340,400 yen. 1,000,000 yen are placed to the business extension fund; dividends at the rate of 10 per cent. per annum, absorb 928,135 yen, leaving to be carried forward to next term 412,265 yen. The company have in service 106 vessels, aggregating 190,017 tons gross, and there are also 83,800 tons gross building.

Ericsson Shipping Company, Ltd.—The report for the year ended September 30 states that the profit and loss account shows a credit balance of £8,766, to which must be added £393 brought forward. Deducting £1,319 for interest on debentures and interim dividend, £750, there remains £7,089. The directors recommend that this balance be appropriated as follows: In paying final dividend of 10 per cent. (making 15 per cent. for the year), £1,500; proportionate dividend on new issue, £5,000; at 5 per cent., £250; income-tax reserve, £1,000; depreciation, £3,513; underwriting account, £200; maintenance and reserve account, £200; balance to be carried forward, £426. During the whole of the period covered by the accounts the ss. *Monitoria* has been employed on Admiralty work and the *Hibernia* has been similarly employed from October 22, 1914. Under these circumstances, the company's steamers have not been able to participate in the exceptional conditions prevailing in the freight market. In October, 1914, the company contracted on very favourable terms for two "Monitor" vessels of about 5,500 tons d.w. each, being a larger size than hitherto built, but owing to the builders' establishment having been taken up with Government work it is at present impossible to say when delivery can take place. In this connection the directors decided to issue a further 5,000 ordinary shares at par to the existing shareholders in proportion to their holding. These shares were fully applied for and allotted.

Palmers Shipbuilding & Iron Company, Ltd.—The 50th annual report states that the company has been declared a controlled establishment under the Munitions of War Act, 1915, as from July 12 last. This involves the transfer of excess profits to the Government from that date. The profits accrued on work in progress to June 30 last have therefore been estimated and taken credit for in the accounts for the past year. Including these estimates the trading profit for the year ended June 30, after providing for repairs and maintenance of plant, depreciation, and special income-tax reserve, amounts to £131,886. Debenture and other interest amounts to £28,064, leaving a net profit of £103,822, as compared with £65,096 for the previous year. The company disbursed during the year £808,819 in wages, as compared with £589,728 for the previous year. There are sufficient orders in hand to keep the works well employed for some time to come. The amount at debit of profit and loss brought forward from last year was £61,050. This is now turned into a profit balance of £42,772, but in view of the agreement entered into with the debenture trustees and the prior lien debenture holders no dividend will be paid on either class of shares until the prior lien debentures are repaid. The scheme of modernising the iron and steel works, referred to at the last annual meeting as being under consideration and negotiation, has been brought to a satisfactory conclusion. The contemplated arrangements are being carried out, and the first deliveries of the new plant are on the ground. Since June 30, £250,000 prior lien debentures have been created and issued as security for a similar amount of cash, which is being advanced as required.

NEWS PARAGRAPHS.

Increased Wages for Belfast Shipyard Workers. The wages of 25,000 Belfast shipworkers have been advanced 2s. a week. All trades have accepted this excepting the blacksmiths and engineers.

San Francisco-Orient Trade.—A Reuter cable from San Francisco, dated October 4, says: "The Bank Line, of London, it was announced here to-day, will enter the San Francisco-Orient trade shortly with a line of freighters. The first steamer will be the *Inverie*, which will begin loading at Hong-Kong for San Francisco about November 1."

Japanese Shipping.—The Nippon Yusen Kaisha has decided to join the New York Conference, so as not to become involved in a rate war with the other companies composing it. In consequence of the forthcoming withdrawal of American steamers from the transpacific routes, the Nippon Yusen Kaisha, Osaka Shosen Kaisha and Toyo Kisen Kaisha have agreed to maintain additional sailings between Japanese ports and San Francisco.

New Australian-American Service.—Davies & Fehon, Ltd., announce the establishment of a regular line of steamers from Australia to San Francisco, taking cargo from Melbourne, Sydney and Brisbane for this port, as well as for New York, Philadelphia, Boston and other Eastern points. The first steamer will be the *Werribee*, to be followed by the *Navarino*. Davies & Fehon are well known in the lumber exporting trade of San Francisco, and it is quite likely that for return cargoes to Australia these steamers will take lumber.

New London-New York Service.—The Cunard Line is inaugurating a new fortnightly service between London and Boston. The first sailing will be the ss. *Headley*, on October 16, from Surrey Commercial Docks, to be followed later by the *Toronto*. The *Pannonia* will sail from London on October 23, carrying freight and cabin passengers to New York, thus extending the passenger services of the company. In 1911 the Cunard Line acquired the Thomson Line, and entered the London trade with Canada, a regular service being maintained between London and Montreal in the summer, and Portland (Maine) in the winter. In November, 1914, a new weekly service was inaugurated between London and New York, which has also proved very popular,

Nelson and Ellerman Liners Lost.—After a period of comparative immunity two serious disasters to liners are reported. The Nelson liner *Highland Warrior*, bound for Buenos Ayres, has gone ashore near Corunna at which port she was calling. Salvage of her cargo was proceeding, but bad weather has driven the salvors from the vessel and she has blown further in shore, 90 guineas per cent. being quoted against the risk of total loss at the time of writing. She is a vessel of 7,485 tons register, built in 1911 and insured on a value of £110,000, the top value of the fleet. The Ellerman liner *Rufford Hall*, bound for Vladivostock from New York, stranded on a reef in the Tsugury Strait, where the current, running at a speed of about 5 knots, makes salvage operations extremely difficult. Thirty guineas per cent. was paid against total loss on receipt of the news of her stranding, but an Easterly gale setting in she has commenced to break up and is regarded as a total wreck. Built in 1914, of 5,506 tons register, she is insured on a value of £60,000, though it would be difficult to replace her for twice the money.

Lockwell Steamship Company.—The Lockwell Steamship Company carried on business at 22, Great St. Helens, London, E.C., and was compulsorily wound up some little time ago. The report of Mr. E. C. Bliss, official receiver and liquidator, has now been issued. The accounts filed under the liquidation show total liabilities £12,507, of which £8,234 is expected to rank against assets valued at £3,755, after deducting £109 for payment of preferential claims. The deficiency to the contributories is estimated at £6,478. The report in question states that the company was incorporated in 1912 to acquire the steamer *Brantwood*, of 2,295 net tons, from the Brantwood Steamship Company. The nominal capital of the company was £2,000, and the whole of it (except the signatories' shares) was subscribed and paid for in full by the partners in the firm of Roth Bros., of Paris, the promoters. The business was nominally managed by Roth Bros. (London), Ltd. The purchase price of the *Brantwood* was £22,500 and the vessel's name was altered to the *Lockwell*. Certain questions arise on the second mortgagee's account; if the accounts are in order and the first mortgagee succeeds in establishing his claim to the money in court there will apparently be a surplus for the unsecured creditors.

OFFICIAL NOTICES AND SHIPS FOR SALE.

FOR SALE.

(PARTICULARS NOT GUARANTEED.)

Folio 9047.—New Steamer now building. About 7,800 tons d.w. on about 22 ft. 3 in. draught. Single Deck. Long Bridge. Triple Engines. Three S.E. Boilers. Estimated speed 10 knots on about 26 tons. Do not anticipate delivery before January, 1916.

Folio 9059.—Built 1906. Surveyed 1914. About 6,850 tons d.w. on about 22 ft. 5 in. draught. Single Deck. Triple Engines. Three S.E. Boilers. Speed about 9 knots on about 20 tons.

Folio 8721.—Built 1897. Surveyed 1914. About 5,850 tons d.w. on about 23 ft. 10 in. draught. One Deck and Spardeck. Triple Engines. Two S.E. Boilers. Speed about 9½ knots on about 21 tons.

Folio 8987.—Built 1908. Surveyed 1913. About 5,400 tons d.w. on about 20 ft. 11 in. draught. Single Deck. Triple Engines. Two S.E. Boilers. Speed about 9⅝ knots on about 17 tons.

Folio 9030.—Built 1899. Surveyed 1912. About 4,800 tons d.w. on about 20 ft. 1 in. draught. Single Deck. Triple Engines. Two S.E. Boilers. Speed about 9/10 knots on about 17 tons.

Folio 9177.—Built 1895. About 2,800 tons d.w. on about 18 ft. 3 in. draught. Part Awning Deck. Triple Engines. Two S.E. Boilers. Speed about 8 knots on about 10 tons.

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Sunderland.

Telegraphic Address—"Spardeck."

NEW MARINE BOILERS FOR SALE.

FOR SALE two new single ended Marine Boilers. 13 ft. 9 in. inside diameter by 11 ft. overall length; each with three Fox's corrugated furnaces, 40 in. diameter. Constructed by Messrs. Ramage & Ferguson, Ltd., Leith, of highest class materials and workmanship to Lloyd's Rules for working pressure of 175 lb.

Full particulars on application to

JAMES CURRIE & CO.,
16, Bernard Street,
Leith.

"SHIPBUILDING AND SHIPPING RECORD" TABLE OF SHIP SALES.

Name and type.	Tonnage.	Dimensions. Draught in ( ).	Sold by, to	Builders, hull and year.	Machinery and builders.	Remarks.
Aladdin, ss. (pt. awning (dk.)	3,013 gr. 1,898 net.	324½′ × 41½′ × 20′	Dmpsk. Aladdin's Rederi (A. S. Chr. Michelsen & Co.) Bergen, to Norwegian buyers	Ropner & Son, Stockton (1892)	22⅝, 37, 61 × 42 (Blair & Co., Stockton)	Price about £45,000. Sold in March for about £25,000.
Allan, ss. (well dk.)	1,285 gr. 807 net. 1,850 dw.	230′ × 34¼′ × 16′	Dmpsk. Ocean Ltd. (J. A. Christensen), Aarhus, Denmark, to J. Lindvig, Kragerö, Norway	Mackay Bros., Alloa (1907) ...	18, 30, 48 × 33 (Hutson & Sons, Glasgow)	Price about 535,000 kr.
Borg, ss. (well dk.) (ex *Aagre*, ex *Stadsbud*, ex *Hampton*)	2,071 gr. 1,231 net 3,075 dw.	279′ × 38¼′ × 19′	Rederiaktieb. Borg (R. Göhle), Norrköping, Sweden, to Thv. Halvorsen, Bergen	J. Blumer & Co., Sunderland (1888)	21⅛, 36, 59 × 39 (N.E. Mar. Eng. Co., Sunderland)	Price about £27,750.
Cardiff, ss. ...	2,808 gr. 1,786 net. 4,750 dw.	318′ × 46′ × 21′ (19½′)	Treherbert SS. Co., (Morel, Ltd.), Cardiff, to R. W. J. Sutherland, Cardiff	W. Gray & Co., W. Hartlepool (1898)	23, 36½, 62 × 39 (Cen. Mar. E. Works, W. Hartlepool)	Price about £42,000.
Centenario, ss.	3,637 gr. 2,345 net. 6,300 dw.	346½′ × 50¼′ × 22½′	Ford & Dodero, Buenos Ayres, to Thor. Thoresen, jun., Christiania, per Kellock & Co.	J. L. Thompson & Sons, Sunderland (1907)	24½, 40, 66 × 45 (J. Dickinson & Sons, Sunderland)	Price about £76,000.
Danmark, s.b. renamed **Arsis**	1,467 gr. 1,374 net.	231¼′ × 34¼′ × 20½′	Act. Barkskibet "Danmarks" Rederi (J. F. Dessauer), Copenhagen, to Hans Borge, Tonsberg	Burmeister & Wain, Copenhagen (1892)	—	Price about £6,750.
Demetrios, ss. (well dk.) (ex *Ben Lethy*)	1,916 gr. 1,220 net. 2,810 dw.	270′ × 36½′ × 21′ (20½′)	G. Vergottis, Piraeus, to buyers not stated	J. Laing, Sunderland (1884)	30, 60 × 39 (G. Clark, Sunderland)	Price about £23,500.
Den of Ruthven, ss. (spar dk.), renamed **Ulanda**	4,937 gr. 3,116 net.	405′ × 52′ × 19¼′	Barrie SS. Co. (C. Barrie & Sons), Dundee, to Furness, Withy & Co., Liverpool	Chas. Connell & Co., Glasgow (1907)	27, 44, 73 × 48 (D. Rowan & Co., Glasgow)	Price about £200,000 the two.
Den of Glamis, ss., renamed **Dahomey**	5,191 gr. 3,318 net.	405 × 52 × 28	Barrie SS. Co. (C. Barrie & Sons), Dundee, to Furness, Withy & Co., Liverpool	Napier & Miller, Glasgow (1910)	27, 44, 73 × 48 (D. Rowan & Co., Glasgow)	
Eptalofos, ss. (pt. awning dk.) (ex *Mary*)	2,419 gr. 1,556 net. 3,600 dw.	301′ × 39¼′ × 19¼′ (19¼′)	M. J. Mango (Mango & Co.), Piræus, to foreign buyers	J. Priestman & Co., Sunderland (1893)	22½, 37, 61 × 42 (W. Allan & Co., Sunderland)	Price about £30,000. Sold in April last year for about £8,000.
Finn, ss. ...	3,806 gr. 2,473 net. 6,650 dw.	346′ × 49½′ × 25¼′ (23¼′)	Acties. SS. Finn (J. Christensen), Bergen, to I. A. Christensen, Christiana	J. L. Thompson & Sons, Sunderland (1906)	25, 42, 68 × 48 (J. Dickinson & Sons, Sunderland)	Price about £88,750. Recently sold for about £82,000.
Freshfield, ss. (ex *Conrad*, ex *La Perla*)	3,445 gr. 2,166 net. 4,000 dw.	345¾′ × 44′ × 24½′ (23⅝′)	Freshfield SS. Co. (J. Esplen), Liverpool, to British buyers	R. Napier & Sons, Glasgow (1896)	26, 39, 70 × 54 (R. Napier & Sons, Glasgow)	Price about £35,000.
Manxman, ss. (ex *Cabo*, ex *Nuestra Senora de Guadalupe*, ex *Cabo*)	4,827 gr. 3,122 net. 6,850 dw.	430½′ × 45½′ × 30′	Elder Dempster & Co., Liverpool, to British buyers	Harland & Wolff, Belfast (1888)	27, 44½, 74 × 60 (Harland & Wolff, Belfast)	
M.S. Dollar, ss. (spar dk.) (ex *Sunset Dollar*, ex *Tappa Maru*, ex *Arabi*)	4,216 gr. 2,674 net 6,000 dw.	375′ × 46¼′ × 20½′	Dollar SS. Line (Rob. Dollar & Co.), San Francisco, to British buyers	Palmers' Co., Newcastle (1890)	28, 45, 74 × 48 (Palmers' Co.)	
Norburn, ss. ...	2,023 gr. 1,222 net. 3,500 dw.	281′ × 43½′ × 18½′ (17½′)	Norburn SS. Co. (Smith Hogg & Co.), W. Hartlepool, to British buyers	Craig, Taylor & Co., Stockton (1908)	22, 35, 58 × 39 (Cen. Mar. E. Works, W. Hartlepool)	
Oceana, ss. (spar dk.) (ex *Seal*)	7,796 gr. 4,230 net. 6,000 dw.	531′ × 54¾′ × 17¾′	Morse D.D. & Repair Co., New York, to Spanish buyers	W. Denny & Bros, Dumbarton (1891)	32½, 57½, 92 × 67 (Denny & Co., Dumbarton)	Price about £60,000. Sold in 1910 for about £40,000. Acc. 500 1st pass.
Povena, ss. (part awning dk.) (ex *South Gwalia*)	2,116 gr. 1,306 net. 3,100 dw.	271¼′ × 38′ × 18½′ (20′)	Cia. Nav. Sota y Aznar (Sota y Aznar, Mgrs.), Bilbao, to G. Einar Johannesen, Bergen	W. Gray & Co., W. Hartlepool (1894)	20, 31½, 53 × 36 (Cen. Mar. Eng. Works, W. Hartlepool)	Price about £30,000.
St. Andrew ss. (pt. awning dk.) (ex *Maria*)	2,430 gr. 1,505 net.	295′ × 40½′ × 17¼′	Angf. Aktieb. St. George (Th. Willerding), Gothenburg, to R. Amlie, Haugesund	Ropner & Son (Stockton) (1894)	27½, 56½, 62½ × 39 (Blair & Co., Stockton)	
Trewidden, ss. (pt. awning dk.)	2,613 gr. 1,683 net. 4,200 dw.	298¾′ × 40′ × 20′ (22¾′)	Hain SS. Co. (E. Hain & Son), St. Ives, to Whimster & Co., Glasgow	J. Readhead & Sons, South Shields (1892)	23, 37½, 61 × [illegible] (J. Readhead & Sons)	

SHIPPING SHARE MARKET.

The declaration of interim dividends announced by several steamship companies during the week has served to divert the fresh troubles in the Balkans. Prices keep remarkably well considering the circumstances, and a disposition on the part of the public to take an interest in steamship companies' securities continues to be indicated. The provincial centres especially seem to be keen for the shares of leading companies. The New Zealand Shipping Company has declared a dividend of 16s per share (of which 8s. was paid in April last) this declaration being the same as last year, but the amount carried forward is increased from £[illegible] to £[illegible]. This is the fourth year that the shareholders have received the same amount, and the financial position appears to have improved somewhat as regards the Company's capital. The General Steam Navigation Co. has declared its customary interim dividend at the rate of 6 per cent. per annum, the same as for the previous four years, although the company has been particularly unfortunate owing to three of its ships and crews being detained in Hamburg, which means a cost of from £4,000 to £5,000 per annum. The Commonwealth & Dominion Line have also announced a bonus of 2 per cent., making 8 per cent. for the year. These indications of dividend payments being sustained or increased is creating a very favourable impression among investors, and, if the latter are prudent enough not to be induced to buy the shares of new and improved companies at high premiums they may safely entrust their capital in steamship companies with the knowledge that they will get a substantial income-yield from it and that it is rendering assistance to the country. The market has noted with interest that the Cunard Line is inaugurating a new fortnightly service between London and Boston. The price of the shares has improved to £[illegible]. Indo-China deferred and Prince Line shares, both of which have been in the public eye of late, have also recovered some of the loss exhibited in value a week ago.

SHIPPING, SHIPBUILDING, ENGINEERING AND MARINE INSURANCE SHARE LIST.

SHIPPING AND DOCKS.

Name.	Share and paid.	Extreme quotations, 1913.	Last ann. div., or per share.	Yield. %	Quotation, July 30, 1914.	Cash price during week.
	£					
African S.S.	20	21½—19⅛	7	7¼	18–20	18—20
Allan Line ... ... Deb.	100	95—89	4	4½	93½—95¼	94
Anchor Line ... Cum. pref.	10	10¼—10	5⅜	5¼	10—10⅜	10⅜
Do. ... ... Deb.	Stk.	98⅝—98⅜	4½	4	104—106	102¼
Argentine Nav. ... Cum. pref.	1	29/6—25/6	3	4½	⅝—⅞	⅝
Do. ... ... Deb.	Bds.	104⅛—100⅛	6	6	98—100	91
Australasian Un. S. Nav. Deb.	Stk.	84½—81½	4	4¾	80—83	80—83
Belfast Steam ... ... "A"	10 (5pd.)	5⅜—4½	5	3	4¾—5¼	5
British & African Nav. Deb.	Stk.	102—101	4½	4½	96½—98½	99½
British India Nav. ... Deb.	Stk.	104—98⅜	4½	4½	99½—100	95
Bucknall SS. ... Cum. pref.	2	2⅜—1¾	5½	—	—	—
Cairn Line ... ... Deb.	Bds.	102—94	5	5½	91—93	90½-91½
Clan Line ... ... Ord.	10	142—9	15	10⅝	10⅛—11	13½
Court Line ... ... Ord.	£1	...	10	9	—	1¼
Cunard SS. ... ... Ord.	1	35/9—28/-	20	7	1⅞—1⅞	2⅜
Do. ... Cum. pref.	Stk.	103—97⅛	5	5⅛	99—101	92
Do. ... ... Deb.	Stk.	102⅛—99	4½	4½	101—103	96
Elder Line ... ... Deb.	Stk.	103—100	4½	5	98—102	90
Elder Dempster ... Cum. pref.	1	1½—1½	5½	5½	1⅛—1⅛	1⅛
Do. ... ... Deb.	Stk.	105—99½	5	5¼	102—104	90
Ellerman Lines ... Pref. Ord.	10	10⅜—10⅞	6¼	6	10—10⅜	9⅜
Do. ... Cum. pref.	10	10⅛—10⅜	4½	4½	10—10⅜	9⅜
France Fenwick ... Cum. pref.	5	97 6—92 6	5½	6½	4⅜—5	4⅜
Furness, Withy ... Ord.	1	34 3—25 6	10	6½	1⅜—1⅜	1⅜
Do. ... Cum. pref.	10	9⅜—9¼	5	5¼	9⅜—10	8⅞
General Steam Nav. Ord.	7½	6¼—5½	6	8	5⅜—5⅝	6⅜
Do. ... ... Pref.	8	7¼—7⅛	6	8	7⅛—7¼	6⅜
Houlder Line ... Cum. pref.	5	85—60 –	Nil.	Nil.	2⅜—2⅝	3⅜xd
Do. ... ... Deb.	Stk.	84⅜—80	4⅜	5¼	81—86	84½
Houlder Bros. ... Cum. pref.	5	4⅜—3	5⅜	6	4⅜—4⅝	4⅜
Do. ... ... Deb.	Stk.	85—78	4⅜	5½	81—86	82
India Gen. Nav. & Rly. ... Ord.	10	9⅜—7 1/16	8	9½	9—10	8¾
Indo-China N. ... Pref Ord.	5	5⅜—87 6	6	5⅝	3¼—4¼	5⅛
Irrawaddy Flotilla	40	125—114	15	5¼	126⅝—128⅜	—
King Line ... ... Ord.	10	9¼—8	8	7⅝	8¼—9¼	10¼
La Guaira Harbour ... Deb.	Stk.	87—79	5	7¼	78—80	66
Lamport & Holt ... Cum. pref.	£1	1⅜—⅞	6	6	⅛—1⅛	⅝
Leyland (F.) ... Cum. pref.	10	11—9⅞	10	12½	7¼—8¼	7⅜
Do. ... ... Deb.	100	99⅜—95⅜	4	4	99—101	—
Mercantile SS. ... ... Ord.	5	8 1/16—6¾	17½	10⅜	6—6⅜	8⅛
Do. ... ... Pref.	1	18/—16/3	5	5½	¾—1	⅞
Moor Line ... ... Ord.	10	14—11⅞	15	—	—	—
Nelson Steam Nav. ... Deb.	100	103⅜—99	5	5¼	99½—101⅛	97½
New Zealand ... ... Ord.	£10	20½—10⅜	8	4½	14½—15½	19⅛
Do. ... ... Deb.	Stk.	95—92⅜	4	4¼	92—94	89½
Nitrate Producers SS. ... Ord.	5	8⅜—8	17½	6⅜	8—8⅛	12¾
Do. ... Cum. pref.	5	5—97/6	5	5	4⅛—5	4⅝—5
Oceanic Steam. Nav. ... Deb.	100	100—96⅜	4½	4¾	97—99	96⅜
Orient.Stm.Nav.Co. Cum. pref.	10	10⅜—9⅝	5	5 1/16	9⅞—10	9⅞
Do. ... ... Deb.	100	99—94½	4½	4⅝	98—100	97⅜
P. & O. S. N. ... Cum pref.	100	125½—107	5	5¼	109—112	96
Do. ... ... Def.	100	350—270	15	5½	270—290	266
Do. ... ... Deb.	Stk.	91—83	3½	5	84—86	70
Prince Line	1	25/3—20/-	5	3½	1—1⅛	2
R.M.S.P. ... ... Ord.	100	143—100½	Nil.	Nil.	82—87	80⅜
Do. ... ... Pref.	Stk.	100⅜—98	5	5⅛	98—101	88⅜
Do. ... ... Deb.	Stk.	104¾—100¼	4½	5¼	101—103	87⅜
Shaw, Savill & Alb. Cum. pref.	5	5 1/16—98 3	5	5	4⅜—5	4⅜—5
Shell Transport ... ... Ord.	1	5⅛—96/10½	30	5⅝	4—4⅛	4⅞
Do. ... Cum pref.	10	11⅛—10	5	5⅛	10⅜—10⅝	9⅛
Sutherland SS. Co.	£1	1⅛—1	20	13⅝	1—1⅛	1⅛
Union-Castle SS. Cum. pref.	10	10—9⅛	4½	5	8¼—9¼	8¾
Do. ... ... Deb.	Stk.	95⅜—92	4	4⅜	93—95	88½
West Hartlepool ... ... Pref.	10	4¾—3 1/16	5½	9¾	2⅜—3⅜	5⅛xd

INSURANCE.

Alliance	20 (2·4 pd.)	12⅞—11⅜	12/-	6¾	11⅜—12⅜	8½
Do. (new shares)	1	14 1/16—12⅝	12/-	5¼	15½—14½	9⅜
Indem. Mutual Marine	15 (3 pd.)	10⅛—8½	18⅓	6	10—11	9⅜
London Assurance	25 (12½ pd.)	54—49	20	6	54—56	42½
Marine Insurance	25 (15 pd.)	38⅜—36⅓	45/-	6⅔	38⅜—39¼	35⅝
Maritime Insurance	10 (2 pd.)	5⅜—4 1/16	12½	—	8 1/16—8⅜	—
Merchants' Marine Insurance ...	10 (2½ pd.)	66 3—61/3	7½	5	4—4½	3⅞
N. British & Mercantile Ord.	25 (6¼ pd.)	40½—38⅛	40/-	6	40⅝—41½	28 1/16
Do. Pref.	Stk.	100⅜—95½	4	5¼	98—100	77⅜
Phœnix Assurance	10 (1 pd.)	7⅜—7	40	6¼	7⅜—8⅛	5¾
Reliance Marine	10 (2 pd.)	7—6½	17½	4½	7 1/16—7⅜	7 1/16
Royal Exchange Assurance ..	Stk.	210—196½	10	5½	213—218	191½
Sea Insurance	10 (2 pd.)	20—17½	8	4	20—21	20 1/16
World Marine, Limited	5 (2 pd.)	25 —23 1½	5	5⅜	1 1/16—1 1/16	1 1/16

* With arrears. † Includes 2½ bonus.

IRON AND STEEL.

Name.	Share and paid.	Extreme quotations, 1913.	Last ann. div. % or per share.	Yield. %	Quotation, July 30, 1914.	Cash price during week.
	£					
Babcock & Wilcox... ... Ord.	1	69 4½—56/3	16	5½	2⅝—2⅞	2⅛
Baldwins ... Cum. pref.	1	22/6—21/3	5½	5⅛	1 1/16—1 3/16	1 3/16
Do. ... ... Deb.	Stk.	100¼—100¼	4½	4½	97—99	98
Bayliss, Jones ... Cum. pref.	1	—	5	7½	⅜—⅝	⅜
Bell Bros. ... ... Cum. pref.	10	12 1/16—11	6	5 1/16	11⅝—12⅛	10 5/16
Do. ... ... Deb.	Stk.	98—96⅜	4	4 1/16	96—98	96—98
Bessemer (Henry) ... Ord.	1	1⅜—1⅛	10	8⅛	1⅛—1⅛	1 1/16
Bolckow Vaughan ... Ord.	1	22/6–19/4½	6	6¼	1 1/16—1⅛	1⅛
Do. ... ... Cum. pref.	20	21⅛—20 –	5	5⅛	20—21	19½
Cargo Fleet Iron ... ... Ord.	1	11 10½—7/6	2⅜	5	1 1/16—1 1/16	⅝
Do. ... ... Deb.	100	91—85½	4½	5¼	89—92	87
Consett Iron Co. ... ... Ord.	1	88/6—74/6	30	10	3⅜—3⅞	2 1/16
Dominion Iron & Steel	Bds.	100½—88⅜	5	6	83—87	76
Dorman, Long ... ... Ord.	1	21/6—16/9	7½	8⅜	2⅛—2⅜	1 1/16
Do. ... ... Deb.	Stk.	88⅜—85⅜	4	4½	87—90	84¼
Ebbw Vale Steel & Iron Ord.	1	18/—16/–	10	11⅓	3⅛—2⅞	3
Guest, Keen & Nettefids Ord.	1	68 9—61/3	15	5	3 5/16—3 1/16	2 1/16
Do. ... ...Cum. pref.	5	5 1/16—5⅛	5	4⅝	5 1/16—5 1/16	5⅛
Do. ... ... Deb.	Stk.	100⅜—95¾	4	4½	96—98	83½
Hadfield's Steel Foundry Ord.	1	63/—58 9	22½	6¾	3—3⅛	3⅞
Hawthorn (R. & W.) Leslie Ord.	10	13—12	10	7½	13⅜—13⅝	13½—13⅝ xd
Ibbotson Bros.	5 (4 pd.)	7—5¼	10	7 1/16	6—6¼	6—6⅜
Jessop (W.) & Sons ... Ord.	5 (4 pd.)	6⅜—6⅛	15	11 1/16	6⅜—6⅝	6¼
Lanarkshire Steel Cum. pref.	10	7½—6½	5	6 7/16	5¼—6⅜	6
Lysaght (J.) ... Cum. pref.	1	27/6—25 –	6	5	1⅛—1⅜	1⅛
Do. ... ... Deb.	Stk.	108⅜—102⅛	4½	—	104—106	—
Manganese Bronze ... Ord.	1	⅜—⅝	6	11	⅝—⅜	⅜
Do. ... ... Cum. pref.	1	1—⅞	6	6 1/16	¾—1	⅞
North-Eastern Steel ... Deb.	Stk.	89—92	4½	—	—	—
Palmers Ship & Iron "A"	1	1/16—1/16	Nil.	Nil.	⅛—⅛	⅛
Scott (Walter) ... ... Ord.	1	16/—14/6	5	6 1/16	⅝—¾	⅝
Do. ... ... Deb.	Stk.	86—82	4	4⅝	81—82	89—91
Sheffield Forge ... ... Ord.	1	1⅞—1⅜	12½	7	1⅜—1⅜	1⅜
Shelton Iron & Steel ... Deb.	100	99⅜—90	5	5⅜	93—98xd	94
S. Durham Steel & Iron Ord.	1	35/—23 6	10	6 1/16	1⅜—1⅜	1⅜
Do ... ... Cum. pref.	1	20/6—19/-	6	5 1/16	1 1/16—1 1/16	1⅛
Do. ... ... Deb.	Stk.	95—98	4½	4½	90—92	90—92
Steel Co. of Scotland ... Ord.	10	12⅜—8⅜	5	5⅝	8⅜—9	8¾—9⅛
Stewarts & Lloyds Pref. ord.	10	21 1/16—20	10	5⅛	20—21	19⅞
Do. ... ... Cum. pref.	10	14⅝—13⅓	6	4⅝	11 3/16—13 7/16	13 1/16
Stone (J.) ... ... Cum. pref.	10	9⅜—9	5	5⅝	8¾—9⅛xd	9⅛
United States Steel ... Ord.	100$	71⅝—50	3	3½	61—61⅜	85⅛
Do. ... ... Cum. pref.	100$	113⅜—104½	7	6¾	112—113	120
Vickers Ltd. ... ... Ord.	1	43/6—33/3	12½	7½	11 1/16—11⅜	11 1/16
Do. ... ...Pref.	Stk.	106⅛ 99	5	5	104—107	100
Do. ... ... Deb.	Stk.	100⅜—91½	4	4½	96⅜—98½	82
Weardale Steel ... Def. ord.	1	21/—17/-	6	7½	⅜—1 1/16	11 1/16
Do. ... ... Cum. pref.	1	20/13/8–18/-	6	6⅜	1 1/16—1	1
Do. ... ... Deb.	Stk.	77—73½	4	5	77—80	77—80
Workington Iron & Steel Ord.	1	16/6—12/3	6	8½	21/32—43/64	11 1/16

SHIPBUILDING AND MARINE ENGINEERING.

Armstrong, Whitworth Ord.	1	60/—39/	12½	6	1 31/32—2 1/32	1¼
Do. ... ... Cum. pref.	5	95—84/6	4	5¼	4 1/16—4 1/16	3 1/16
Do. ... ... Deb.	Stk.	98¾—94½	5	6¼	96—98	80⅜
Beardmore (W.) ... ... Deb.	100	96¼—91½	4½	5⅛	94—96	89
Brown (John) ... ... Ord.	1 (15s. pd.)	23/—17/9	12½	9½	2⅝—2 1/16 xd	1
Do. ... ... Cum. pref.	10	10¼—9 1/16	5	5 1/16	9⅜—10xd	8 5/16
Cammell Laird ... ... Ord.	5	2¼—2⅛	7½	7½	3⅜—4⅛	3xd
Do. ... ... Cum. pref.	5	92/6—79/-	5	6¼	4¼—4⅜	3⅝
Do. ... ... Deb.	100	90½—84½	4½	5	92—94	90
Dunlop (Jas.) ... ... Ord.	1	18/6—17/6	Nil.	—	1⅛—1⅜	1 1/16
Do. ... ... Cum. pref.	1	1⅛—⅞	6	7½	⅞—1	1 1/16
Fairfield Shipbldg Cum. pref.	10	10—7⅞	8	8 3/16	—	7⅞
Fleming & Ferguson ... Ord.	10	20½—12¾	10	6¼	14½—14¾	14¼
Gray (Wm.) ... ... Deb.	100	100⅜—100	4½	4½	100–102	100
Henderson (D. & W.) Cum. pref.	1	⅞—1⅛	5	12	1 1/16—1 1/16	⅞
Richardsons Westgarth Ord.	1	3/6—1/9	Nil.	Nil.	1 1/16—⅞	⅞
Do. ... ... Cum. pref.	1	9 9—4 3	Nil.	Nil.	⅜—⅝	⅜
Do. ... ... Deb.	Stk.	70—58	4½	6¾	55—58	69½
Simons (W.) ... Cum. pref.	10	10⅛—10	5	4⅝	10¼—10⅜	10⅛
Stephenson (R.) ... ... Ord.	1	66⅜—53	Nil.	Nil.	—	—
Do. ... ... Deb.	Stk.	66¼—63	Nil.	Nil.	—	—
Swan, Hunter & W. R. ... Ord.	1	19,10½-16/-	†10	10½	1⅛—1	1 1/16
Do. ... ... Cum. pref.	1	19/9—17/9	5	5⅝	1 1/16—1	1 1/16
Do. ... ... Deb.	Stk.	90⅛—88	4¼	4⅞	90—93	90—93
Thornycroft (John I.) ... Ord.	1	27/6—12/6	8	8	⅝—⅞	⅝
Do. ... ... Cum. pref	1	19/3—11/3	6	7⅝	⅝—⅞	⅝
Do. ... ... Deb.	100	94—91	5	5 1/16	88—92	93
Wallsend Shipway ... Ord.	1	1 1/16—1 1/16	10	—	1⅛—1 1/16	—
Do. ... ... Cum. pref.	1	20/—20/-	5	—	1 1/16—1 1/16	—

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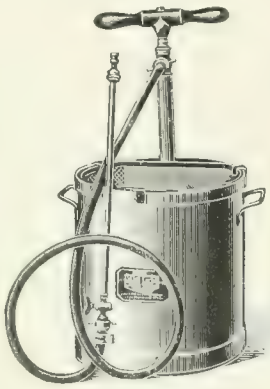

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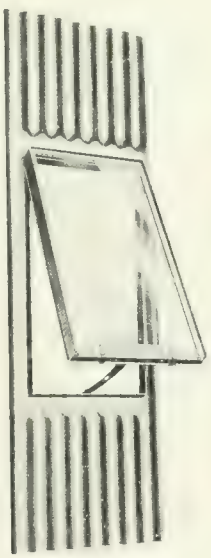

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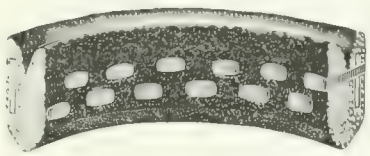

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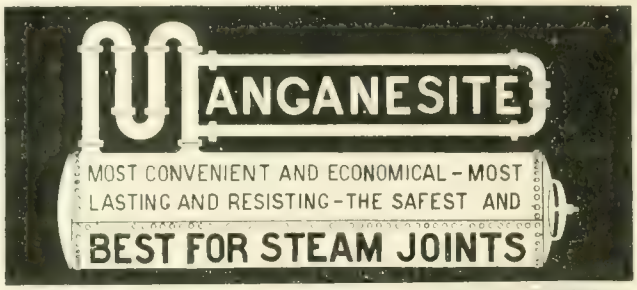

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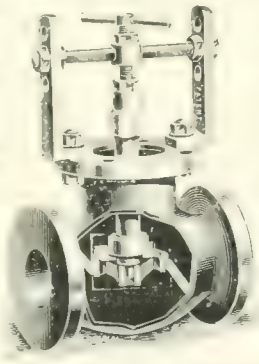

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ACETYLENE—
[illegible] Sights.
Carbic Ltd., 52, Holborn Viaduct, London, E.C.

AERIAL ROPEWAYS—
[illegible] Mark Lane, London, E.C.

AIR COMPRESSORS—
Bellis & Morcom Ltd., Birmingham.
[illegible] Co., Ltd., Trafford Park, Manchester.
[illegible] Co., 28, Grange Road, Bermondsey, London, S.E.
Richardsons, Westgarth & Co., Ltd., Hartlepool.
Weir, G. & J., Ltd., Cathcart, Glasgow.

AIR PUMPS—
[illegible], S.E.
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Bellis & Morcom, Ltd., Birmingham.
[illegible] Co., Ltd., Trafford Park, Manchester.
Dawson & Downie, Elgin Works, Clydebank.
[illegible] Co., 28, Grange Road, Bermondsey, London, S.E.
Richardsons, Westgarth & Co., Ltd., Hartlepool.
Weir, G. & J., Ltd., Cathcart, Glasgow.

ALUMINIUM GOODS—
[illegible] Eclipse Works, Glasgow.

ALUMINIUM PAINT—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

ANCHORS—
Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.
[illegible]-Tyne.
Spencer, John, & Sons, Ltd., Steel Works, Newburn-on-Tyne.
Sykes, Richard, & Son, Ltd., Cradley Heath.
Taylor, Samuel, & Sons (Brierley Hill), Ltd., Brierley Hill, Staffs.
[illegible], Ltd., Tipton, Staffs.

ANTI-CORROSIVE COMPOSITIONS—
[illegible], Ltd., Dudley.
Hamilton, Archd., & Co., Possilpark, Glasgow.
Holzapfels, Ltd., Newcastle-on-Tyne.
Hoyle, Robson, Barnett & Co., Ltd., St. Nicholas Chambers, Newcastle-on-Tyne.
Milburn, A., & Co., Sunderland.
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.
Websters Ltd., Hull.

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Hoyle, Robson, Barnett, & Co., Ltd., St. Nicholas Chambers, Newcastle-on-Tyne.
Websters Ltd., Hull.

ANTI-FRICTION METALS—
[illegible] Ltd., Lanport, Staffs.
Bowran, Robt., & Co., Ltd., Newcastle-on-Tyne.
Delta Metal Co., Ltd., East Greenwich.
McConnell, A., & Co., Ltd., 60, Drury Buildings, Water Street, Liverpool.

ARMOUR PLATES—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.

ASBESTOS FITTINGS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

ASBESTOS GOODS—
Beldam Packing & Rubber Co., Ltd., 1 and 2, Gracechurch Street, London, E.C.
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

ASH BAGS—
Speedings Ltd., Sail Works, Sunderland.

ASH BINS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Hingley & Lamb, Ltd., Stour Works, Lye, Worcs.

ASH DISCHARGING APPLIANCES—
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.
Trewent & Proctor, F. J., Ltd., 43, Billiter Buildings, E.C.

AWNINGS—
Speedings Ltd., Sail Works, Sunderland.

BARROWS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

BARROWS (Cargo)—
[illegible] Broad Wynd, Leith.

BEDDING & NAPERY— [Glasgow.
Stewart, Archibald & Co., 40-48, Union Street,

BEMAL CONDENSER TUBES—
Yorkshire Copper Works, Ltd., Leeds.

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Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.

BLINDS—
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.

BLOCKS—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.
Higginson & Co., 7, Hurst Street, Liverpool.

BLOWERS—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. [Belfast.
Davidson & Co., Ltd., Sirocco Engineering Works,
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

BOATS—
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.

BOILERS—
Central Marine Engine Works, West Hartlepool.
Elliot & Jeffery, East Dock, Cardiff.
Harris Bros., Ltd., Cambrian Dry Docks, Swansea.
Hawthorn, R. & W., Leslie & Co., Ltd., St. Peter's, Newcastle-on-Tyne.
Howden, James, & Co., Ltd., Scotland St., Glasgow.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., East Cowes, I.W.

BOILER CIRCULATORS—
Beresford Eng'n'ring Co., Beresford Lane, Cardiff.

BOILER CLEANER—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

BOILER COMPOSITION—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

BOILER COVERING—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

BOILER MOUNTINGS—
Cockburns Ltd., Cardonald, Nr Glasgow.
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

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Leeds Forge Co., Ltd., Leeds.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

BOILER PRESERVATIVE—
Atlas Preservative Co., Ltd., Deptford, S.E.

BOILER TUBES—
Yorkshire Copper Works, Ltd., Leeds.

BOLTS AND NUTS—
Coventry Chain Co., Ltd., Coventry.

BORING MACHINES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.
Greenwood & Batley, Ltd., Albion Works, Leeds.

BRASS & COPPER FITTINGS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

BRASS & COPPER RODS—
Delta Metal Co., Delta Works, East Greenwich, London, S.E.

BRASS FOUNDERS—
Billington & Newton, Ltd., Longport, Staffs.
Chambers, John, Ltd., Lowestoft.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow. [Street, Glasgow.
McGeoch, Wm., & Co., Ltd., 28, West Campbell
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.
Williams, Wm., Alexandra Brass Foundry, Cardiff.

BRASS NAME-PLATES—
Metograph Co., 280, Cathedral Street, Glasgow.
Rennie & Co., North Greenhill Road, Paisley.

BRASS TUBES—
Yorkshire Copper Works, Ltd., Leeds.

BRASSWORK—
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.

BRONZE (Manganese)—
Billington & Newton, Ltd., Longport, Staffs.
Bowran, Robt., & Co., Ltd., 4, St. Nicholas Buildings, Newcastle-on-Tyne.
Callender's Cable & Construction Co., Ltd., Belvedere, Kent.
Delta Metal Co., Ltd., E. Greenwich, London, S.E.
Stone, J., & Co., Ltd., Deptford, London, S.E.

BRIGHT STEEL—
Stonehouse Works Co., Ltd., Houghton Street, West Bromwich.

BUCKETS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Hingley & Lamb, Ltd., Stour Works, Lye, Worcs.

BULKHEADS (Patent)—
Hogg-Carr Construction Co., Ltd., Newcastle-on-Tyne.

BUNTING—
Riley, Edward, & Co., Leeds.

BUOYANT DECK SEATS— [Liverpool.
Crichton, C. & H., Ltd., Huskisson Engine Works,
Lindleton's Patent Ship Fittings Co., Hudson Street, North Shields.

BUOYS—
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.

CABINET MAKERS—
Stewart, Archibald & Co., 40-48, Union Street, Glasgow.

CABLES (Chains)—
Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.
Sykes, Richard, & Son, Ltd., Cradley Heath.
Taylor, Samuel, & Sons (Brierley Hill), Ltd., Brierley Hill, Staffs.
Wright, Joseph, & Co., Ltd., Tipton, Staffs.

CAISSONS & DOCK GATES—
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.

CALORIFIERS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

CAPSTANS (Electric)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.
Stothert & Pitt, Ltd., Bath.

CARGO BLOCKS—
Higginson & Co., 7, Hurst Street, Liverpool.

CARPETS—
Stewart, Archibald & Co., 40-48, Union St., Glasgow.

CASE HARDENING BOXES—
Else, John, & Son, Ltd., 48, Muntz St., Birmingham

CASE HARDENING COMPOSITION—
Else, John, & Son, Ltd., 48, Muntz St., Birmingham

CASE HARDENING OIL—
Else, John, & Son, Ltd., 48, Muntz St., Birmingham

CAST BRASS PLATES—
Brown, Robert, & Co., 12, Espedair St., Paisley.

CASTINGS (Steel)—
Brown, John, & Co., Atlas Works, Sheffield, and [illegible] Nr. Glasgow.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Stewarts & Lloyd's, Ltd., 41, Oswald St., Glasgow.

CASTINGS (Steel, Iron and Brass)—
Chambers, John, Ltd., Lowestoft.
Darlington Forge Co., Ltd., Darlington.
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

CEMENT—
Aberthaw & Bristol Channel Portland Cement Co., Ltd., Merthyr House, Cardiff.

CHAINS—
"Coventry" Chain Co., Ltd., Spon End Works, Coventry.

COAL—
Beynon, T., & Co., Ltd., Merthyr House, Cardiff.
Britannic Merthyr Coal Co., Ltd., Cambrian Bldgs., Cardiff.
Cambrian Collieries, Ltd., Cambrian Bldgs., Cardiff.
Davis, D., & Sons, Ltd., Cymric Bldgs., Cardiff.
Ebbw Vale Steel, Iron & Coal Co., Ltd., Merthyr House, Cardiff.
Fernhill Collieries, Ltd., Merthyr House, Cardiff.
Glamorgan Coal Co., Ltd., Cambrian Bldgs., Cardiff.
Harrisons (London), Ltd., 66, Mark Lane, E.C.
Naval Colliery Co. (1897), Ltd., Cambrian Bldgs., Cardiff.
Newport Abercarn Black Vein Steam Coal Co., Ltd., Merthyr House, Cardiff.
Powell Duffryn Steam Coal Co., Ltd., Cardiff.
Rhymney Iron Co., Ltd., Merthyr House, Docks, Cardiff

COMPASSES (Ship)—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.

CONDENSERS—
Bellis & Morcom, Ltd., Birmingham.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Dawson & Downie, Elgin Works, Clydebank.
Richardsons, Westgarth & Co., Ltd., Hartlepool.
Royles, Ltd., Irlam, Nr. Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

CONDENSER TUBES (Brass and Copper)—
Yorkshire Copper Works, Ltd., Leeds.

CONTROLLERS & CONTROL GEAR—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

CONVEYORS—
Mather & Platt, Ltd., Manchester.

COOKING APPARATUS—
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Grieve, T., & Sons, Bedford Street, North Shields.

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Royles Ltd., Irlam, Nr. Manchester.

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CORK INSULATION—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W. [Newcastle-on-Tyne.
Newalls Insulation Co., 31, Mosley Street,

CORRUGATED IRON—
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Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.

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Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

CRANES—
Ransomes & Rapier, Ltd., 32, Victoria St., S.W.
Stothert & Pitt, Ltd., Bath.

CYLINDERS (Copper)—
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DELTA METAL—
Delta Metal Co., Delta Works, East Greenwich, S.E.

DERRICKS & DAVITS—
Howden, James, & Co., Ltd., 95, Scotland Street, Glasgow.
Stewarts & Lloyd's, Ltd., 41, Oswald St., Glasgow.

DISTILLING APPARATUS—
Royles Ltd., Irlam, Nr. Manchester.

DIVING APPARATUS—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, S.E.
Mining Engineering Co., Ltd., Meco Works, Moorfields, Sheffield.

DOCK & SHIP LIGHTING—
Carbic Ltd., 52, Holborn Viaduct, London, E.C.

DOCK GATES—
Chalmers, Wm., & Co., Ltd., Rutherglen, Nr. Glasgow.
Hamilton, Wm., & Co., Ltd., Port Glasgow.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.

DOORS (Watertight)—
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Stone, J., & Co., Ltd., Deptford, S.E.

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DREDGING—

DRILLING MACHINES—

DRILLS—

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DYNAMOS—

ELECTRIC CRANES—

ELECTRIC DERRICKS—

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ELECTRIC HEATING & COOKING APPARATUS—

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Boothroyd, H. T., Ltd., Bootle, Liverpool.
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British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.

ELECTRIC-LIGHTING PLANT—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.

ELECTRIC MOTORS—
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.

ELECTRIC WIRES—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.

ELECTRICAL CONTRACTORS—
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Martin, W. C., & Co., 10, West Campbell Street, Glasgow.
Mather & Platt, Ltd., Manchester.

ELECTRICAL ENGINEERS—
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.
Graham, Alfred, St. Andrew's Works, Crofton Park Road, S.E.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

ELECTRICAL INSTRUMENTS (Ammeters)—
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.

ELECTRICAL INSTRUMENTS (Circuit Breakers)—
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.

ELECTRICAL INSTRUMENTS (Relays)—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.

ELECTRICAL INSTRUMENTS (Voltmeters)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.

EMERY WHEELS—

ENAMEL MANUFACTURERS—
Holzapfels, Ltd., Newcastle-on-Tyne.
Websters Ltd., Hull.

ENGINE (Electric Light)—
Belliss & Morcom, Ltd., Birmingham.

ENGINES (Land)—
Chambers, John, Ltd., Lowestoft.

ENGINES (Marine)—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Chambers, John, Ltd., Lowestoft.
Hawthorn, R. & W., Leslie & Co., Ltd., St. Peter's, Newcastle-on-Tyne.
Howden, James, & Co., Ltd., Scotland St., Glasgow.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

ENGINE & DECK STORES—
McGeoch, Wm. & Co., Ltd., 28, West Campbell Street, Glasgow.
Metallic Valve Co., Colonial House, Water Street, Liverpool.

ENGINE AUXILIARIES—
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.

ENGINE FITTINGS—
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.
McRobbie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

ENGINE-ROOM OUTFITS—
Grieve, T., & Sons, Bedford Street, North Shields.

ENGRAVERS—

EVAPORATORS—
Central Marine Engine Works, West Hartlepool.
Richardsons, Westgarth & Co., Ltd., Hartlepool.
Royles, Ltd., Irlam, Nr. Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.

EXTRUDED METALS (Brass, Bronze, Copper, Delta Metals)—
Delta Metal Co., Ltd., E. Greenwich, London, S.E.

FANS—
Adam, J. M., & Co., Greenfield Iron Works, Dalmarnock, Glasgow.
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Davidson & Co., Ltd., Sirocco Engineering Works, Belfast.
Hogan & Waterop, , Gresham Buildings, Basinghall Street, London, E.C.
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

FEED-WATER HEATERS—
Beresford Eng'n'ring Co., Beresford Lane, Cardiff.
Central Marine Engine Works, West Hartlepool.
Richardsons, Westgarth & Co., Ltd., Hartlepool.
Royles, Ltd., Irlam, Nr. Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.

FILES—
Brown, John, & Co., Atlas Works, Sheffield.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

FILTERS (Marine)—
Central Marine Engine Works, West Hartlepool.
Chambers, John, Ltd., Lowestoft.
Cockburns, Ltd., Cardonald, Nr. Glasgow.
Mather & Platt, Ltd., Manchester.

FIREBARS—
Liverpool Patents Co., Ltd., Derby Square, James Street, Liverpool.

FIRE EXTINGUISHERS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Mather & Platt, Ltd., Manchester.

FIRE-FIGHTING APPLIANCES—
Minimax Engineering Co., Ltd., Meco Works, Sheffield.

FLAGS—
Speedings, Ltd., Sail Works, Sunderland.

FLOATING DOCKS—
Hamilton, Wm., & Co., Ltd., Port Glasgow, Scotland.

FLOOR COVERING—
Docker Bros., Ltd., Metropolitan Road, Saltley, Birmingham.

FORCED DRAUGHT—
Adam, J. M., & Co., Greenfield Iron Works, Dalmarnock, Glasgow.
Davidson & Co., Ltd., Sirocco Engineering Works, Belfast.
Howden, J., & Co., Ltd., Scotland Street, Glasgow.
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

FORGING PRESSES—
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.

FORGINGS—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

FORGINGS (Bronze)—
Delta Metal Co., Delta Works, East Greenwich, London, S.E.

FORGINGS (Steel)—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

FUMIGATORS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.

FURNACE BRIDGES—
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.
McConnell, A., & Co., Ltd., 60, Drury Buildings, Water Street, Liverpool.

FURNACES—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Deighton's Patent Flue & Tube Co., Ltd., Vulcan Works, Pepper Road, Leeds.
Leeds Forge Co., Ltd., Leeds.
Piggott, T., & Co., Ltd., Birmingham.

FUSES—
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

GALLEY GEAR—
Grieve, T., & Sons, Bedford Street, North Shields.

GALVANIZERS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

GAS ENGINES—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Mather & Platt, Ltd., Manchester.

GAUGES—
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

GEAR CUTTING—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

GEARING—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds

GEARS—
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

GEARS (Noiseless or Silent)—
British Thomson-Houston Co., Ltd., Rugby.
Brown, David, & Sons (Hfd.), Ltd., Huddersfield.

GOVERNORS—
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.

GRINDING MACHINES—
Greenwood & Batley, Ltd., Albion Works, Leeds.

GRINDING WHEEL MACHINES—
Sterne, L., & Co., Ltd., Crown Iron Works, Glasgow

HATCH COVERS (Patent)—
Hogg-Carr Construction Co., Ltd., Newcastle-on-Tyne.

HEATING APPARATUS—
Ashwell & Nesbit, Ltd., Barkby Lane, Leicester.
Royles, Ltd., Irlam, Nr. Manchester.
Saunders & Taylor, Ltd., 43, Lower Mosley Street, Manchester.

HEATING ENGINEERS—
Ashwell & Nesbit, Ltd., Barkby Lane, Leicester.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles, Ltd., Irlam, Nr. Manchester.
Saunders & Taylor, Ltd., 43, Lower Mosley Street, Manchester.

HELM SIGNAL TELEMOTORS—
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.

HIGH SPEED DRILLS—
Brown, John, & Co., Atlas Works, Sheffield.

HIGH SPEED STEEL—
Brown, John, & Co., Atlas Works, Sheffield.

HOISTS—
Mather & Platt, Ltd., Manchester.
Stothert & Pitt, Ltd., Bath.
Waygood-Otis, Ltd., Falmouth Road, S.E.

BUYERS' GUIDE—*continued.*

HOSE—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

HYDRAULIC CRANES—
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Brown Brothers & Co., Ltd., Rosebank Iron Works, Edinburgh.
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh

HYDRAULIC MACHINERY—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Waygood-Otis, Ltd., Falmouth Road, S.E.

HYDRANTS—
M'Robie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

INDIARUBBER—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London S.E.

INDICATORS—
Robinson, A., & Co., Ltd., Bootle, Liverpool.

INDUCED DRAUGHT—
Davidson & Co., Ld., Sirocco Eng'n'g W'rks, Belfast
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

INSULATIONS—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W. [Liverpool.
Liverpool Refrigeration Co., Ltd., Colonial House,

IRON ROOFS AND BUILDINGS—
Fraser, E., & Co., Ltd., Eclipse Works, Glasgow.

JOINTING MATERIAL (Manganesite)—
Hudson & Co.'s Successors, John, 15, Victoria Warehouses, Mansell Street, E.C.

LAMPS AND LIGHTS—
Grieve, T., & Sons, Bedford Street, North Shields.
Kaye, Joseph, & Sons, Ltd., Leeds.

LAUNCHES—
Chambers, John, Ltd., Lowestoft.
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
Livingstone & Cooper, Ltd., Hessle, Hull.
MacLaren Bros., Ltd., Dumbarton.
Perman & Co., Ltd., 82-83, Fenchurch St., E.C.
Seamless Steel Boat Co., Ltd., Wakefield.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, London, S.W.
Watson, J. S., Gainsborough.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

LAUNDRY MACHINERY—
Bradford, T., & Co., Salford, Manchester.

LAVATORY FITTINGS AND APPLIANCES—
Levick, John, Alma Street, Aston, Birmingham.

LEAD (Sheets and Pipes)—
Rimer Bros., Newcastle-on-Tyne.

LEAD (White and Red)—
Rimer Bros., Newcastle-on-Tyne.

LIFEBELTS AND BUOYS—
Speedings Ltd., Sail Works, Sunderland.

LIFTS (Window)—
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.

LIFTS AND HOISTS—
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh
Waygood-Otis, Ltd., Falmouth Road, S.E.

LIGHTERAGE—
Alexander, W. H. J., St. John's Wharf, Wapping, E.

LIGHTERS—
Chalmers, Wm., & Co., Ltd., Rutherglen, Nr. Glasgow.
Crichton, J., & Co., Saltney Shipyard, Chester.
Watson, J. S., Gainsborough.

LIMEWASHING & DISINFECTING MACHINES—
Stonehouse Works Co., Ltd., Houghton Street, West Bromwich.

LOCKS—
Kaye, Joseph, & Sons, Ltd., Leeds.

LOCOMOTIVE TUBES (Copper & Brass)—
Yorkshire Copper Works, Ltd., Leeds.

LUBRICATORS— [Cranstonhill, Glasgow.
M'Robie, John, & Sons, 94, Elliott Street,

MACHINE TOOLS—
Campbells & Hunter, Ld., Dolphin Foundry, Leeds.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Scriven & Co., Leeds Old Foundry, Leeds.

MACHINERY NAME PLATES—
Brown, Robert, & Co., 12, Espedair St., Paisley.

MAGNESIA—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

MARINE ENGINEERS—
Bailey, C. H., Newport, Mon. Barry Docks.
Barry Graving Dock & Engineering Co., Ltd.,
Brown, John, & Co., Ltd., Clydebank, Nr. Glasgow.
Chambers, John, Ltd., Lowestoft.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool. [Southampton.
Day, Summers & Co., Ltd., Northam Ironworks,
Delegación de la Compañia Trasatlantica, Cadiz.
Diamond, Thos., & Co., Cardiff.
Doxford, Wm., & Sons, Ltd., Sunderland.
Elliott & Jeffery, East Dock, Cardiff.
Gray, Wm., & Co., Ltd., West Hartlepool.
Harland & Wolff, Ltd., Belfast.
Harris Bros., Ltd., Cambrian Dry Docks, Swansea.
Hawthorn, R. & W., Leslie & Co., Ltd., Hebburn-on-Tyne.
Hill's Dry Docks & Engineering Co., Ltd., Cardiff.

MARINE ENGINEERS *(contd).—*
Livingstone & Cooper, Ltd., Hessle, Hull.
Mountstuart Dry Docks, Ltd., Cardiff.
Perman & Co., Ltd., 82-83, Fenchurch St., E.C.
Richardsons, Westgarth & Co., Ltd., Hartlepool, Middlesbrough and Sunderland.
Shearman, John, & Co., Ltd., Cardiff.
Simons, Wm., & Co., Ltd., Renfrew, Nr. Scotland.
Stephen, Alex., & Sons, Ltd., Linthouse, Govan, Glasgow.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne. [Westminster, S.W.
Thornycroft, John I., & Co., Ltd., Caxton House,
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.
Workman Clark & Co., Ltd., Belfast.
Yarrow & Co., Ltd., Glasgow.

MARINE GOVERNORS—
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.

MARKING-OFF TABLES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

MATTRESSES—
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

METALLIC PACKING—
Beldam Packing & Rubber Co., Ltd., 1 and 2, Gracechurch Street, London, E.C.
McConnell, A., & Co., Ltd., 60, Drury Buildings, Water Street, Liverpool.
United States Metallic Packing Co., Ltd., Bradford

METAL SPINNINGS—
Levick, John, Alma Street, Aston, Birmingham.

METALS (Patent)—
Bowran, Robt., & Co., Ltd., Newcastle-on-Tyne.
Delta Metal Co., Ltd., Delta Works, East Greenwich.

MOTOR BOATS—
Chambers, John, Ltd., Lowestoft.
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
Livingstone & Cooper, Ltd., Hessle, Hull.
Perman & Co., Ltd., 82-83, Fenchurch St., E.C.
Seamless Steel Boat Co., Ltd., Wakefield.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, London, S.W.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

MOTOR STARTING AND CONTROL GEAR— [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

NAVAL ARCHITECTS' SUPPLIES—
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

OIL CANS—
Kaye, Joseph, & Sons, Ltd., Leeds.

OIL ECONOMISERS—
Kaye, Joseph, & Sons, Ltd., Leeds.

OIL ENGINES—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Edina Manufacturing Co., 19h, Broad Wynd, Leith.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, S.W.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

OIL-FUEL INSTALLATION—
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

OIL IMPORTERS & BLENDERS—
Rimer Bros., Newcastle-on-Tyne.

PACKING (Engine)—
Beldam Packing & Rubber Co., Ltd., 1 and 2, Gracechurch Street, London, E.C.
Walker, Jas., & Co., Ltd., Lion Works, Garford Street, West India Dock Road, E.

PAINTS—
Briggs, W., & Sons, Ltd., Dundee.
Cocks, Harry, & Co., Cardiff.
Hamilton, Archd., & Co., Possilpark, Glasgow.
Hoyle, Robson, Barnett, & Co., Ltd., St. Nicholas Chambers, Newcastle-on-Tyne.
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.
Websters Ltd., Hull.

PANELLING—
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

PATENT HAWSE PIPE AND DECK FLANGE—
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.

PERFORATED METALS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Piggott, T., & Co., Ltd., Birmingham.

PIPES—
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.
Yorkshire Copper Works, Ltd., Leeds.

PLANING MACHINES for Plate Edges—
Scriven & Co., Leeds Old Foundry, Leeds.

PLATE BENDING ROLLS—
Scriven & Co., Leeds Old Foundry, Leeds.

PORCELAIN ENAMELLED CAST IRON—
Levick, John, Alma Street, Aston, Birmingham.

PROPELLERS—
Billington & Newton, Ltd., Longport, Staffs.
Chambers, John, Ltd., Lowestoft. [Liverpool.
Crichton, C. & H., Ltd., Huskisson Engine Works.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

PROPELLER BLADES—
Billington & Newton, Ltd., Longport, Staffs.
Darlington Forge Co., Ltd., Darlington.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

PUBLICATIONS—
"Shipbuilding and Shipping Record," Queen Anne's Chambers, Westminster, London, S.W.

PULLEY BLOCKS—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.
Higginson & Co., 7, Hurst Street, Liverpool.
Loveridge, Ltd., Cardiff.
Wright, Joseph, & Co., Ltd., Tipton, Staffs.

PUMPS—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Beresford Eng'n'ring Co., Beresford Lane, Cardiff.
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Central Marine Engine Works, West Hartlepool.
Davey & Co. (London), Ltd., 88, West India Dock Road, E.
Dawson & Downie, Elgin Works, Clydebank.
Edina Manufacturing Co., 19h, Broad Wynd, Leith.
Hall, J. P., & Sons, Ltd., Peterborough.
Mather & Platt, Ltd., Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.

PUNCHING AND SHEARING MACHINES—
Scriven & Co., Leeds Old Foundry, Leeds.

RADIATORS—
British Thomson-Houston Co., Ltd., Rugby.
Low, Archibald, & Sons, Ltd., 72, Muirkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

RADIATOR TUBES—
Yorkshire Copper Works, Ltd., Leeds.

REAMERS—
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

REFRIGERATING MACHINERY—
Hall, J. & E., Ltd., Dartford Ironworks, Kent.
Liverpool Refrigeration Co., Ltd., Colonial House, Liverpool.
Sterne, L. & Co., Ltd., Crown Ironworks, Glasgow.

RESCUE APPLIANCES—
Mining Engineering Co., Ltd., Meco Works, Moorfields, Sheffield.

REVERSING ENGINES (Direct-Acting Type)— [Works, Edinburgh.
Brown Brothers & Co., Ltd., Rosebank Iron
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh

RHEOSTATS & RESISTANCES (all kinds)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A. & Co., Ltd., Hebburn-on-Tyne.

ROPE-CUTTING MACHINES—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

ROPES (Wire)—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

ROUND AND OVAL HOLE CUTTING-OUT MACHINES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

RUBBER GOODS—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

RUBBER HOSE—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

RUSTLESS IRON—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SAFE MANUFACTURERS—
Whitfield's Safe & Door Co., Oxford Street, Birmingham.

SALOON LIGHTS—
Callender's Cable & Construction Co., Ltd., Belvedere, Kent.
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.

SALVAGE—
Alexander, W. H. J., St. John's Wharf, Wapping, E.

SANITARY FITTINGS AND APPLIANCES—
Levick, John, Alma Street, Aston, Birmingham.

SCREWING MACHINES—
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

SHAFTING—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

SHAPING MACHINES—
Greenwood & Batley, Ltd., Albion Works, Leeds.

SHEAVES—
Higginson & Co., 7, Hurst Street, Liverpool.

SHEERS, TRAVERSING (Land and Floating)—
Day, Summers & Co., Ltd., Northam Ironworks, Southampton.

SHIP APPLIANCES—
Linkleter's Patent Ship Fittings Co., 20, Percy Street, Tynemouth.

SHIP BROKERS—
Walford, Leopold (London) Ltd., 29, Gt. St. Helens, E.C

SHIP BROKERS (Sale and Purchase)—
Hall, Edward, Cardiff.
Pinkney, Thos., & Sons, Sunderland.
Walford, Leopold (London) Ltd., 29, Gt. St. Helens, E.C.

BUYERS' GUIDE—*continued.*

SHIPBUILDERS—

[illegible]

[Westminster, S.W.

Co., Ltd., East Cowes, I.W.
Co., Ltd., Belfast.

SHIP CONSTRUCTION—

[illegible]

SHIP FURNISHINGS & FITTINGS—
Cocks, Harry, & Co., Cardiff.
[illegible] Road, E.
[illegible] Sheffield. [Street, North Shields.
Loveridge, Ltd., Cardiff.
[illegible] Street, Glasgow. [Liverpool.
Metallic Valve Co., Colonial House, Water Street,
[illegible]
Waygood-Otis, Ltd., Falmouth Road, S.E.

SHIP LAVATORIES—
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

SHIP PLATES (Steel)—
[illegible]

SHIP REPAIRERS—
Bailey, C. H., Newport, Mon.
[illegible] Liverpool. [Southampton.
[illegible]
Diamond, Thos., & Co., Cardiff.
Doxford, Wm., & Sons, Ltd., Sunderland.
Elliott & Jeffery, East Dock, Cardiff.
Gray, Wm., & Co., Ltd., West Hartlepool.
Grayson, H. & S., Ltd., Royal Liver Building,
Harland & Wolff, Ltd., Belfast. Liverpool.
Harris Bros., Cambrian Dry Docks, Swansea.
[illegible]
Hill's Dry Docks & Engineering Co., Ltd., Cardiff.
Mounstuart Dry Docks, Ltd., Cardiff.
Shearman, John, & Co., Ltd., Cardiff.
Stephen, Alex., & Sons, Ltd., Linthouse, Govan, Glasgow.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
Yarrow & Co., Ltd., Glasgow.

SHIPS' ELECTRIC FITTINGS—
[illegible]
Sunderland Forge & Engineering Co., Ltd., Sunderland.

SHIPS' LAUNDRIES—
Bradford, T., & Co., Salford, Manchester.

SHIPS' TELEGRAPHS—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.
Robinson, A., & Co., Ltd., Bootle, Liverpool.

SIGNAL FLAGS AND CABIN LAMPS—
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.

SILICATE-COTTON SPECIALITIES— [Glasgow.
[illegible]

SKYLIGHT & LIFTING GEARS—
[illegible] Street, Partick, Glasgow.

SLAG WOOL (Silicate Cotton)—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

SLEWING GEAR (for Ships' Derricks)—
[illegible]

SMITHS' HEARTHS— Leith.
Keith, James, & Blackman Co., Ltd., 27, Farring-
[illegible]

SOLDER—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SPEAKING TUBES—
Durham, Churchill & Co., Grimesthorpe, Sheffield.

SPELTER—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SPIRAL SPRINGS—
Cockburns Ltd., Cardonald, Nr. Glasgow.
Sterne, L., & Co., Ltd., Crown Iron Works, Glasgow.

SPONGES—
[illegible]

STAMPINGS—
[illegible]

STAY BOLTS—
[illegible]

STEAM-FITTING MANUFACTURERS—
[illegible]

STEAM-HEATING—
[illegible] Street, Partick, Glasgow.
[illegible]

STEAM KETTLES—
[illegible]

STEAM PIPES—
[illegible]

STEAM TRAPS—
[illegible]
Royles Ltd., Irlam, Nr. Manchester.

STEAMSHIP SPECIALITIES—
[illegible] Sheffield. [Liverpool.
Metallic Valve Co., Colonial House, Water House,

STEEL—
Brown, John, & Co., Atlas Works, Sheffield.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

STEEL BARGES—
Crichton, J., & Co., Saltney Shipyard, Chester.
Watson, J. S., Gainsborough.

STEEL BOATS—
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
Seamless Steel Boat Co., Ltd., Wakefield.

STEEL MAKERS—
[illegible]
Darlington Forge Co., Ltd., Darlington.
[illegible]

STEEL PLATES AND SHEETS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
[illegible]

STEERING-GEAR—
[illegible] Works, Edinburgh.
Chambers, John, Ltd., Lowestoft.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Hastie, John, & Co., Ltd., Greenock.
Higginson & Co., 7, Hurst Street, Liverpool.

STEERING GEAR (Buffers)—
Loveridge, Ltd., Cardiff.

STEERING TELEMOTORS—
Brown Brothers & Co., Ltd., Rosebank Iron Works, Edinburgh.
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh.

STOCKS AND DIES—
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

STORES (Ship)—
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

STRONG ROOM MANUFACTURERS—
Whitfield's Safe & Door Co., Oxford St., Birmingham

STRONG ROOM DOOR MANUFACTURERS—
Whitfield's Safe & Door Co., Oxford St., Birmingham

STRUCTURAL ENGINEERS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SUPERHEATERS—
Central Marine Engine Works, West Hartlepool.
Superheater Corporation, Ltd., Palace Chambers, 9, Bridge Street, Westminster, S.W.

SUSPENSION BULB FURNACE—
Leeds Forge Co., Ltd., Leeds.

SWITCHBOARDS—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Holmes, J. H., & Co., Portland Road, Newcastle-
Mather & Platt, Ltd., Manchester. on-Tyne.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.
Sunderland Forge & Engineering Co., Ld., Sunderland.

SWITCHGEAR & INSTRUMENTS—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

SYRENS—
[illegible] Cranstonhill, Glasgow.

TANK TOP COVERING—
Hamilton, Archd., & Co., Possilpark, Glasgow.
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.

TANKS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Mather & Platt, Ltd., Manchester.

TARPAULINS—
Speedings Ltd., Sail Works, Sunderland.

TELEPHONES—
Graham, Alfred, St. Andrew's Works, Crofton Park Road, S.E.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.

TIMEPIECES—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.

TOOL STEEL—
[illegible]

TOWAGE—
Alexander, W. H. J., St. John's Wharf, Wapping, E.
Tilbury Contracting & Dredging Co., Ltd., Queen Anne's Chambers, Westminster, London, S.W.

TUBE PLATE CUTTING-OUT MACHINES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

TUBES—
Royles Ltd., Irlam, Nr. Manchester.
Staffordshire Tube Co., Ltd., Birmingham.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.
Yorkshire Copper Works, Ltd., Leeds.

TUBES (Brass and Copper)—
Yorkshire Copper Works, Ltd., Leeds.

TUBES & FITTINGS (Wrought Iron)—
Staffordshire Tube Co., Ltd., Birmingham.

TURBINE OIL—
Rimer Bros., Newcastle-on-Tyne.

TURBINES (Auxiliary)—
Belliss & Morcom, Ltd., Birmingham.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Mather & Platt, Ltd., Manchester.

TURBINES (Propulsive)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Brown, John, & Co., Ltd., Clydebank, nr. Glasgow.
Gray, Wm., & Co., Ltd., West Hartlepool.
Harland & Wolff, Ltd., Belfast.
Hawthorn, R. & W., Leslie & Co., Ltd., St. Peter's, Newcastle-on-Tyne.
Howden, James, & Co., Ltd., Scotland Street, Glasgow.
Richardsons, Westgarth & Co., Ltd., Hartlepool.
Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne.
Thornycroft, J. I., & Co., Ltd., Caxton House, Westminster.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.
Workman, Clark & Co., Ltd., Belfast.
Yarrow & Co., Ltd., Glasgow.

TWIST DRILLS—
Brown, John, & Co., Atlas Works, Sheffield.
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

UPHOLSTERERS—
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

VACUUM CLEANERS—
The British Vacuum Cleaner Co., Ltd., 77, Parsons Green Lane, Fulham, S.W.

VALVES—
Cockburns Ltd., Cardonald, Nr. Glasgow.
Mather & Platt, Ltd., Manchester.
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow. [Liverpool.
Metallic Valve Co., Colonial House, Water Street,
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ALPHABETICAL INDEX TO ADVERTISERS.

A

Adam, J. M., & Co. ... ... —
Allen, W. H., Son & Co., Ltd. —

B

Bailey, C. H. 20
Belliss & Morcom, Ltd. 6
Beresford Engineering Co. ... ... —
Berry, Henry, & Co., Ltd. 26
Boothroyd, H. T., Ltd., ... —
Braby, Fredk., & Co., Ltd. 19
Bradford, T., & Co. ... ... —
Brown, John, & Co., Ltd. 5

C

Callender's Cable & Constr'ct'n Co., Ltd. —
Chadburns Telegraph Co., Ltd. ... —
Chambers, John, Ltd. 1
Chatwin, Thos., Ltd. ... ... —
Cockburns, Ltd. ... ... —
Cocks, Harry, & Co. ... ... —
Crichton, C. & H., Ltd. 27
Crichton, J., & Co., Ltd. ... ... —

D

Darlington Forge Co., Ltd. ... ... —
Davey & Co. (London), Ltd. ... ... —
Davidson & Co., Ltd. ... ... —
Davis, D., & Sons, Ltd. ... ... —
Deighton's Patent Tube & Flue Co., —
Delta Metal Co., Ltd. 1

E

Elder, Dempster & Co., Ltd. 25

G

Glamorgan Coal Co., Ltd. ... ... —
Graham, Alfred, & Co. ... ... —
Gray, Wm., & Co., Ltd. ... ... —
Grayson, H. & C., Ltd. ... ... —
Greenwood & Batley, Ltd. 14
Grieve, Thos., & Sons 16

H

Hall, J. & E., Ltd. ... ... —
Hall, J. P., & Sons, Ltd. 8
Hamilton, Archibald H., & Co. ... 20
Hamilton, A., & Sons ... ... —
Harris Bros., Ltd. 20
Harrisons (London), Ltd. 1
Hawthorn, R. &W., Leslie & Co., Ltd. 13
Heinke, C. E., & Co. 1
Higginson, T., & Co. 1
Hingley & Lamb 14
Hogg-Carr Construction Co., Ltd. ... 18
Holmes, J. H., & Co. 12
Holzapfels, Ltd. ... ... —
Hoyle, Robson & Barnett, Ltd. ... 19
Howden, J., & Co., Ltd. ... ... —
Hudson, John, & Co.'s Successors ... 20

I

Isherwood, J. W. ... ... —

J

Jones, Fredk., & Co., Ltd. ... ... —

K

Keith Blackman Co., Ltd., James ... 12

L

Laycock, W. S., Ltd. 1
Leeds Forge Co., Ltd. ... ... —
Liverpool Patents Co., Ltd. 16
Liverpool Refrigeration Co., Ltd. —
Livingstone & Cooper, Ltd. ... —
Low, Archibald, & Sons, Ltd. ... 10

M

MacLaren Bros., Ltd. 1
Mactaggart, Scott & Co., Ltd. 1
McConwell, A., & Co., Ltd. ... ... —
McGeoch, Wm., & Co., Ltd. ... —
Metograph Co. ... ... —
Milburn, A., & Co. ... ... —
Mining Engineering Co., Ltd. ... 16
Mountstuart Dry Docks, Ltd. ... 16

N

Naval Colliery Co. (1897), Ltd. ... —
North Eastern Railway Docks ... —

P

P. & O. Steam Navigation Co. ... 25
Phillips, John, & Sons, Ltd. ... 10 & 28
Piggott, Thos., & Co., Ltd. 12
Powell Duffryn Steam Coal Co., Ltd. —

R

Ransomes & Rapier, Ltd. ... ... —
Reyrolle, A., & Co., Ltd. ... ... —
Richardsons, Westgarth & Co., Ltd. —
Robinson, A., & Co. ... ... —
Royal Mail Steam Packet Co., Ltd. ... 25
Royal Merchant Seamen's Orphanage —

S

Seamless Steel Boat Co., Ltd. ... —
Shearman, John, & Co., Ltd. ... —
Simons, Wm., & Co., Ltd. ... ... —
Spencer, John, & Sons, Ltd ... ... —
Staffordshire Tube Co., Ltd. ... ... —
Stephen, Alex., & Sons, Ltd. ... 9
Sterne, L., & Co., Ltd. ... ... —
Stewart & Lloyd's, Ltd. ... ... —
Stewart, Arch., & Co. ... ... —
Stone, J. & Co., Ltd. ... ... —
Stonehouse Works Co., Ltd. 19
Stothert & Pitt, Ltd. 8
Sunderland Forge & Eng. Co., Ltd. ... 1
Superheater Corporation, Ltd. ... —
Swain, J., & Son, Ltd. ... ... —
Swan, Hunter & Wigham Richardson, Ltd. 11
Swan, Hunter & Wigham Richardson, Ltd., and Maxwell Ballard ... —
Sykes, R., & Sons, Ltd. ... ... —

T

Thornycroft, John I., & Co., Ltd. ... —
Tilbury Contracting & Dredging Co., Ltd. 27
Trewent, F. J., & Proctor, Ltd. ... —

U

Union-Castle Line 25
United States Metallic Packing Co. ... —

W

Wadkin & Co. ... ... —
Walford, Leopold (London), Ltd. ... 4
Walker, James, & Co., Ltd. 19
Walker, James (Glasgow) 20
Wailes Dove Bitumastic Ltd. ... 27
Wallsend Slipway & Eng'g. Co., Ltd. —
Waygood-Otis, Ltd. ... ... —
Weir, G. & J., Ltd. 18
Welin Davit & Engineering Co., Ltd. —
White, J. Samuel, & Co., Ltd. ... 16
Whitfield's Safe and Door Co. ... —
Workman, Clark & Co., Ltd. ... ... —
Wright, Joseph, & Co., Ltd. ... ... —

Y

Yarrow & Co., Ltd. 3
Yorkshire Copper Works, Ltd. ... 1

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Classified Index to Advertisers will be found on pages 21, 22, 23 and 24.

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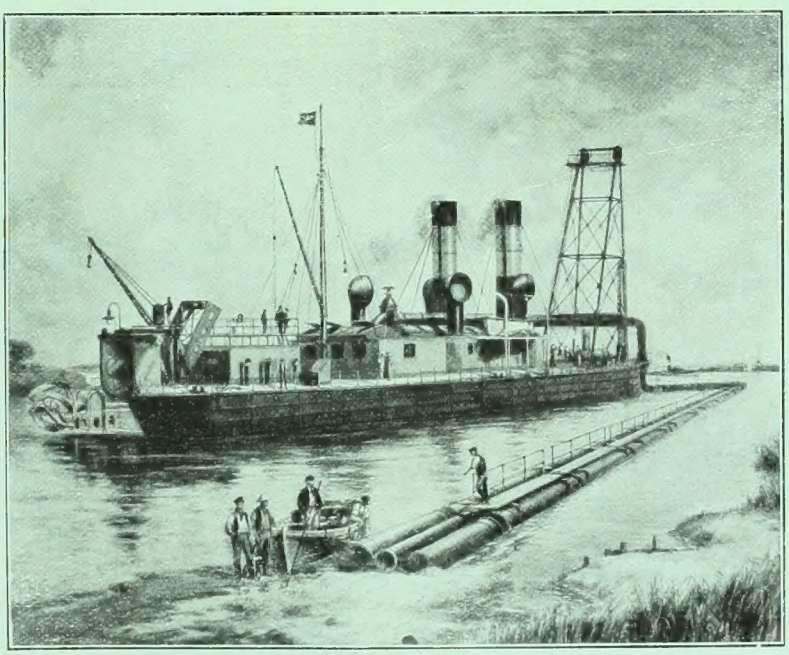

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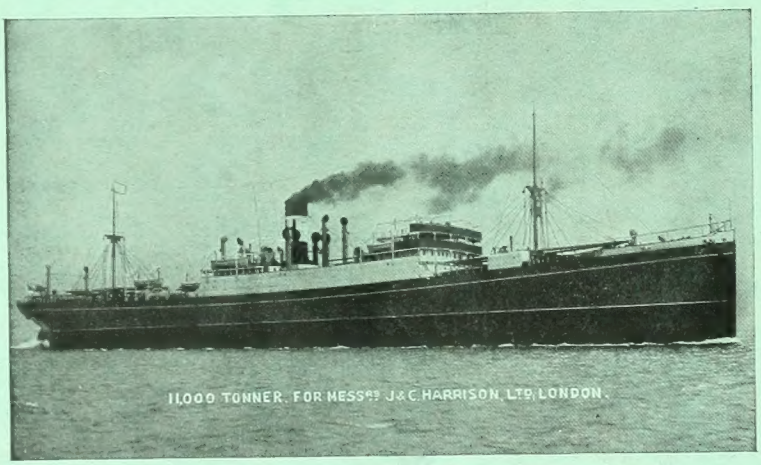

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